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WESTERN AMERICANA

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AT SUNSET: SANTA CATALINA MOUNTAINS, NEAR TUCSON

U of M.

NEW TRAILS IN MEXICO

AN ACCOUNT OF ONE YEAR'S EXPLORATION IN
NORTH-WESTERN SONORA, MEXICO, AND SOUTH-WESTERN ARIZONA
1909–1910

BY

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WITH NUMEROUS ILLUSTRATIONS
INCLUDING TWO COLOR PLATES AND TWO MAPS

NEW YORK
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TO
THOSE WHO LOVE NATURE
IN ALL ITS ASPECTS

PREFACE

During the years 1909 and 1910 I was commissioned by some influential friends to look into certain economical possibilities of the arid and little known country along the upper part of the Gulf of California, east of the Colorado River. My field embraced most of the District of Altar, in the State of Sonora, Mexico, as well as the southern part of the newly admitted State of Arizona; in other words, the region which by the early Spanish chroniclers was designated as Papagueria, after the native inhabitants, the Papago Indians. Some of this country, being the least accessible part of the Sonora Desert, is singularly little known, though lying, so to speak, at the door of the great empire of Yankee enterprise. My mission gave me an opportunity for geographical and ethnological studies, an account of which is here presented in popular form. For this opportunity I am grateful to my friends.

Among my predecessors in exploration of the Papagueria should be mentioned Prof. W. J. McGee, well known from his studies of the Seri Indians, lower down the Gulf. In the nineties he made journeys through parts of this region and he has published interesting accounts of the desert and its natives. In November, 1908,

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Drs. D. T. MacDougal and W. T. Hornaday made a month's trip from Tucson, Arizona, to the Pinacate region, both publishing descriptions which were accompanied by maps by Mr. Godfrey Sykes. These gentlemen, according to their own reports, had no opportunities for extensive explorations of the Papagueria, which I found of such interest that my expedition occupied me over a year. The extreme western part of this region, the sandy country between Pinacate and the Colorado River, so far as my knowledge goes, had not before been investigated. The travels here of the Jesuit fathers during the seventeenth century did not extend much south of the present Mexican boundary. Some of that country probably had not before ever been visited by a white man, and I have therefore described that part of my journey in greater detail, thinking that an accurate account may prove of value and even of practical interest.

This region, no doubt, recently had a less arid climate, with much greater rainfall than at the present time. It seems impossible to explain otherwise the recent great accumulation of detritus at Sonoita, at the origin of the little river of the same name, or the marked effect of the action of the water on the hard rocks of Tinaja de los Papagos. That country is a desert, on account of the scarcity of rain, but the soil is in places extremely fertile and I doubt not that through human agency large parts of it will some day delight the eye with waving fields of grain and orchards of fruit.

Although most of that arid region will always remain suitable only for cattle and horse raising, still there is more of it than people realize which can be brought under cultivation. I may mention the extensive valley which, south of the Mexican boundary line, runs east and west, passing beyond Sonoita, the great plains north-east and south-east of Pinacate, as well as the middle course in most of the flat valleys; for instance, many of those between the Gila range and the ranges following as far east almost as Silver Bell, extending in the west as far north as the Gila River. The problem of water is bound to be solved at some future time, as soon as the necessity arises. Water may be found at a depth of from fifty to a hundred feet, but at most places one would have to go several hundred feet down. Judging from the extraordinary springs I encountered on the shore of the salt deposit, Salina Grande, near the coast, there must be a large sheet of fresh water underneath most of that western coastal desert. This inference seems to be confirmed by the flow of water which was found in digging the well, near Horseshoe in the Quijotoa Range.

The mineral prospects of the region, especially as regards gold, are great. There are numerous large veins south of Sonoita which should be examined and the mountains of the western desert explored. Free gold which undoubtedly has been encountered in the malpais in the northern part of Pinacate should also be followed up.

The extraordinary adaptation to arid conditions of plant and animal life, even the domesticated animals of Indians and Mexicans subsisting without difficulty for months without water, cannot help but interest the observer. With the exception of the Seri and Pima Indians the natives of the desert have so far received little attention from those engaged in the study of primitive races. The Papagoes are the great desert people of America and are remarkably stable in their racial characteristics, still preserving traditions and habits of the past which will soon disappear. There are also ancient remains left since the occupancy of that same country by people who had a higher state of development than the present-day Indians. Original documents relating to the history of the region are not always of easy access, and I have not had an opportunity of consulting them.

In spite of excessive heat in the summer the nights are always cool, and the climate is salubrious and even invigorating. During three months in the spring I travelled without wearing a hat, which made me feel comfortable and actually cooler. The one drawback to a journey in those regions is, of course, the want of water, and, because of this, caution is necessary, but this need not interfere with the enjoyment of the freedom of the wilds. I can understand the expression of an enthusiastic person who for the first time felt the charm of the desert: "I am drunk with out-of-doors!" When I, in the easy surroundings of civilized life, read my notes from the field, it sometimes occurs to me that this or that which I went through was well done; but what in civilization appears as hardship, privation, or risk amounts to little when actually happening, even if one is, as the Irishman said, "a thousand miles from home and fifty miles from any place."

To the lover of nature in all aspects, this land of "silence, solitude, and sunshine" cannot help but present a strong fascination. The wonderful colors of the late afternoon, the glorious sunsets, the peace and calm of night, the thrill that accompanies the early dawn of the morning are sources of constant delight to the traveller. Besides, an expedition of this kind directs one's thoughts into other channels than those of the ordinary humdrum of life. The starlit sky, under which one sleeps with impunity, invites imagination to take flight into the infinite universe, and one has time to reflect on the beauty of existence and the grandeur of nature, a pleasure which is denied to most dwellers in cities.

During my travels I used an Army Sketching Case, designed and patented by Glenn T. Smith, topographer, United States Geological Survey, and I collected besides a large amount of data of geographical importance. Of the region traversed by me a considerable portion appears on the hitherto published maps as blank space. The International Boundary Commission, which takes in generally from two and a half to three miles on each side of the boundary. West of Meridian 111, west of Greenwich, and south of Parallel 33 only one topographical sheet, that of Yuma, has been published by the United States Geological Survey.

In making the map herewith presented, as a base for starting, the Atlas sheets of the International Boundary Commission have been used. In Arizona the word "range" has been employed as a synonym for the Spanish *sierra*. This is generally in conformity with the usage of the South-west.

The following maps and authorities were consulted:

1. Report of the International Boundary Commission, 1891–1896.
2. United States Geological Survey.
3. Gulf of California, original survey by U. S. S. *Narragansett*, 1873–1875, the Hydrographic Office, United States Navy Department, Washington, District of Columbia.
4. General Land Office Map, Department of the Interior, 1909.
5. Pima County, by George J. Roskruge, 1893.

While the accompanying map has been made with all possible care and after taking into account all obtainable material, it naturally does not claim absolute accuracy. The task of preparing a map approaching perfection would require as many years as I had months at my disposal.

I desire to express to Mr. A. Briesemeister, of the American Museum of Natural History, who drew the two maps, my appreciation of his painstaking and skilful work. Sr. Y. Bonillas, mining engineer and surveyor in Nogales, kindly assisted in giving the location of certain places, and to his son, Sr. Y. S. Bonillas, of the Instituto Geologico de Mexico, I owe valuable topographical information in regard to the Pinacate region. I am indebted to Mr. G. Sykes for a tracing of the mouth of the Colorado River, 1907, although I disagree with him in his estimate of the extent of the Santa Clara Slough.

The photographs have with few exceptions been taken by myself. I had with me three cameras, all of the so-called Kodak type, made by the Eastman Company, Rochester, New York. The largest carried 5 x 7 films; the other two were Folding Pocket Kodaks, all provided with high-grade lenses. The photograph of the little elf owl, reproduced at page 18, was presented to me by Mr. Herbert Brown, of Tucson, and that of the row of curlews, at page 256, by Mr. Warburton Pike, of British Columbia. The photograph of Casa Grande, which appears on the map of the Papagueria, I owe to the courtesy of the Bureau of American Ethnology. The photograph of the Yaqui chiefs, as well as that of the donkeys bringing bat guano, were taken by a Hermosillo photographer. The clowns and Pablo I had taken in Tucson.

Mr. Marius Dahlgren, my able friend of Tucson, kindly contributed the painting of sunset in the desert, reproduced as frontispiece. Miss Gladys Batchelder Greene was good enough to transcribe the two native songs. The two colored illustrations are by Mr. R. Weber, and the drawings of native implements were made by Mr. W. Baake, after objects collected during the expedition.

The comparative vocabulary, published by the Smithsonian Institution, has been used as a basis for the short vocabularies of Appendix I.

To my good friend, Hon. Franklin MacVeagh, Secretary of the United States Treasury, I am indebted for the official courtesy which he, through the State Department, secured on my behalf in Mexico.

I wish to express my grateful acknowledgment to the

Mexican Government for removing all custom duties for my expedition and for continuing in other ways the pleasant relations of former years.

For the identification of the several plants referred to in the book as well as for valuable information on botanical subjects I am under great obligation to Dr. B. L. Robinson, Curator of the Gray Herbarium, Harvard University. Dr. J. A. Allen, Mr. Frank M. Chapman, and Mr. W. Beutenmüller, of the American Museum of Natural History, New York, have identified certain mammals, birds, and insects. Mr. Samuel Henshaw, of the Museum of Comparative Zoology, Harvard University, has identified various insects. In regard to mineralogical and geological specimens I have consulted with Dr. C. P. Berkey, of Columbia University; Mr. L. P. Gratacap and Dr. E. O. Hovey, of the American Museum of Natural History, as well as with Prof. Cyrus F. Tolman, of Arizona University, who for ten days accompanied me on the expedition near Magdalena, and who has contributed a sketch of the geological formation of the Papagueria, presented as Appendix III. Mr. Nathan Banks, Mr. Barton A. Bean, Dr. J. N. Rose, and Dr. Leonard Stejneger, of the Smithsonian Institution, Washington, have further contributed toward the identification of certain specimens of natural history.

CARL LUMHOLTZ

NEW YORK, 1912

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NEW TRAILS IN MEXICO

NEW TRAILS IN MEXICO

CHAPTER I

WESTWARD BOUND—CIVILIZATION IN THE WEST—TUCSON PAST AND PRESENT—VISIT TO SAN XAVIER DEL BAC—THE PAPAGO INDIAN RESERVATION—ANCIENT FORTIFICATIONS—NATIVE CEMETERIES—ANTIQUITIES—COURTSHIP OF THE NIGHT-HAWKS

In May, 1909, I found myself on a train westward bound for the never-never country. Many a time have I crossed the North American continent and, coming from the East, have noticed the change of natural conditions that takes place west of Chicago. One begins to feel the freedom of the West, the air is very bracing, and the great plains inspire to deeds of energy. The few people in the Pullman car look intent, as if they had some purpose in life. Tourists seldom travel on these trains, but very often consumptives are seen on their way to the land of hope, the arid regions of the South-west around El Paso, Tucson, and other places.

"Pardon me for calling you mister, Judge," said one of my fellow-passengers during our conversation. He was not a good judge himself, I am afraid. Another one to show his good-will gave me the title of colonel, as also did the negro porters.

"Why do you want to discover any more animals? We have enough already," said to me a wise, elderly man from California, connecting in some way my proposed expedition with the discovery of animals.

We pulled out from El Paso and, in a newspaper I had just bought, I read these rather startling lines:

COWBOYS AND SHEEPMEN FIGHT

FIERCE BATTLE AT ATCHEE, COLO.

SHEEPMEN ARE TIED UP AND COWBOYS THEN SLAUGHTER 3,000 HEAD OF SHEEP

GRAND JUNCTION, COLO., *May* 20.—As a result of a battle between the sheepmen and cowboys on a contested ranch near Atchee, Colo., yesterday, 3,000 head of sheep were killed and two sheepmen injured, but not seriously. According to the reports received here the cowboys dashed in upon the herders and tied them to trees and then rode among the sheep, killing them. The slaughter required almost a day. In order to prevent the news from leaking out, it is said, the cowboys first cut the telephone wires and then made their escape into the hills. Several hours later the sheep-herders were discovered and liberated.

A mining man from the West, another of my fellow-passengers, cultivated and intelligent, gave me light on these high-handed proceedings by explaining the feuds between cattlemen and sheepmen as due to the fact that cattle will not graze on ground where sheep have fed. According to my informant, the sheepmen are Mexicans. The cattleowners often hire renegades to do their bloody work. In a battle the previous year, seven men had been killed. The aggressors are masked and escape.

This incident reminded me of a request for the forbearance of the audience put up on a signboard in a far

Western town, "Don't shoot us, we are doing our best," and the advertisement of the barber in a mining camp, "Ears washed without extra charge." Such are the actualities of frontier life, but we should not be led to wrong conclusions about that great Western land in the process of making and its virile, hearty population. The other side to the picture is a much more important one, and it often remains obscure to those who do not know the actual conditions.

Arizona, which concerns us here, has good laws and enforces them. Its public-school system is equal to the best of the commonwealths in the eastern part of North America. This State, which includes not only great mines, cattle, sheep, and angora goat ranches, ostrich farms, etc., but a steadily growing agriculture, was considered a useless waste of desert less than fifty years ago.

As for Tucson, where I made my first head-quarters, one is surprised at the business-like, orderly aspect of everything. In Spanish times the *presidio*, or fort, of Tucson, established in 1776 on its removal from Tubac, resisted many a siege from hostile natives, numbering at times over a thousand. A traveller in 1863 describes it as "the head-quarters of vice, dissipation, and crime. There was neither government, law, nor military protection. The garrison at Tucson confined itself to its legitimate business of getting drunk or doing nothing." To-day on the same site one finds a cosmopolitan, well-laid-out, and clean city of twenty-four thousand inhabitants. In 1880 the Southern Pacific Railroad arrived here, bringing it in more direct touch with the rest of the world. The people met on the streets or in the stores are invariably civil and they are much more so than under the same conditions in New York, besides being more wide-awake. The citizens are public-spirited, prosperous, and progressive, and, best of all, they respect and favor learning, as evidenced by the welcome extended to the Desert Botanical Laboratory of the Carnegie Institution, for the study of desert plants, which was given land in the vicinity. Tucson is the seat of the University of Arizona which, from the modest beginning in the year 1891 of a single building among the greasewood of the mesa, has advanced to an institution of much importance. It has a school of mines and an agricultural experiment station.

The university buildings are charmingly situated in a park of forty acres, where clusters of the native palo verde attracted my attention, displaying in an exuberant manner their yellow spring blossoms, which appear before the leaves. Plants peculiar to the desert region have been planted in the garden, among them a maguey (*agave americana*), the renowned mescal of Mexico, a member of the amaryllis family to which the common garden narcissus belongs. Members of this family the so-called century plants, have large and beautiful spikes of creamy white flowers which are the supreme effort of their lives and after the production of which they die, though able to propagate themselves by shoots. The one in question was seventeen years old when it produced stalk and flowers. The stalk, more than twenty feet high, grew, according to Prof. J. J. Thornber, in

In a Tucson garden

Where peace reigns supreme. San Xavier

six weeks, the maximum growth in one day having been eleven inches. For comparison, it may be mentioned that the Virginia creeper, one of the most rapid-growing plants, has been known to make four inches a day, but it needs deep and rich soil and much water.

Tucson is situated on the Santa Cruz River, a small stream, but important because of its permanency. A fertile valley with alluvial soil surrounds its course, which offered the most direct route for the early Spanish explorers. It disappears in the sand before reaching the Gila River. Tucson is 2,430 feet above sea-level. The name is a corruption of the Papago Tjukson, meaning "at the foot of (*son*) the black hill (*tjuk*)." The word *tjuk** designates the color black, which also by inference means black hill. Originally Tjukson was a Papago rancheria on the river, at the foot of a small hill near that on which the Desert Laboratory is now situated. The climate is hot in summer, the records of 1909 showing that there were only three days in the year when the sun did not shine; still it is a very healthy region, and consumptives prolong life and are even cured by living here. On January 27, 1888, Tucson, according to reports, had four or five inches of snow on the ground.

About nine miles south of Tucson, on the fertile plains along the Santa Cruz River, is the old church of the Mission of San Xavier del Bac. There has been much speculation in regard to the meaning of the word Bac. It is the Spanish rendering of Vak, the Papago name of the locality, and means: "where the river reappears in the sand, a 'sink'." This fine Jesuit edifice does not, according to Mr. Ad. F. Bandelier, date further back than the middle of the eighteenth century, though an attempt at building a church at San Xavier appears to have been made in 1699. It was once a rich mission; the architecture is the usual type of Spanish renaissance, but better preserved than is the case with other missions of the South-west.

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* There should be a slight *s* sound before *t*.

The church is at present surrounded by a reservation of the Papago Indians. The ethnologist will find these Indians more worthy of a visit than he would anticipate, because, owing to the half nomadic habits of the tribe, natives of the interior districts are constantly to be found there. From the tower of the old church I had a fine view of the extensive wheat-fields which the Indians at that time—the beginning of June—were harvesting, and which presented a marked contrast to the barren appearance of some settlements of poverty-stricken Mexican and Yaqui families that live on low hills beyond the river, just outside of the reservation. Horses were gorging themselves in the green fields of barley. Some of the Indians have mowing machines that cost fifty dollars each. I was told that the United States Government supplied agricultural implements. The ambition of these natives still reaches out for a hay-press, which would cost in Tucson nearly four hundred dollars, and a "bog-rake." "That's all we ask for," the Papago policeman said to me. He had a buggy with two horses, which he lent me. They were lazy and did not take any of the unexpected liberties usual with horses raised by Indians. Sewing machines and many of the white man's kitchen utensils are seen in the houses; nevertheless, the people seem very Indian. When spoken to in English they would not answer me, but they would in Spanish, the women always smiling when addressed in that tongue.

Some years had passed since I had been among Indians and I again enjoyed their gentle and sympathetic manner. When I reached there, one woman was toasting green *garbanzos;* she was stirring the large peas in the shallow earthen-wear dish in which corn cakes are baked, and she hospitably offered me a few, presenting them in a beautiful tray with interwoven symbolic figures. Another woman offered me wheat grains which she was toasting on a potsherd. They were simple dishes, these, but how good they tasted because they were well cooked! None of the many civilized man's machine-made productions of a similar kind bear comparison with the plain cuisine of the nimble housewife of the red man. Although dogs here were somewhat numerous, they did not molest. Indian dogs are seldom fierce, but these did not even bark when we approached the houses; they would look at us unconcernedly and lay their heads down again.

The dwellings here, rectangular in shape, are usually adobe huts or light sheds made of sunflower stalks placed upright, three or four sahuaro ribs, which are tied horizontally, binding these together. The walls are usually plastered both inside and out with mud mixed with straw; the uprights are forked poles of mezquite and the same kind of pole always stands in the middle of the house to support the roof. The rafters, too, are of mezquite, the roof consisting besides of a layer of coarse grass called sacaton and another of wheat straw, on top of which is placed mud. The roof is slightly raised in the middle in order that the rain may more easily run off; the floor is earthen. Huts made of upright ocotillo sticks, but otherwise similar, are also seen. A window is rarely found in the houses. Generally there is attached to the house a shed called in Spanish *jacal*, a light roof resting on four or six forked upright poles, which furnishes a grateful shade. Here the cooking is done, and here the family is usually found sitting. The dwellings in the rest of the Papagueria are of a similar type, real adobe houses being seldom met with. The dome-shaped grass huts of the natives are also not uncommon in the interior districts of southern Arizona.

Pottery making is the greatest industry among these Indians, and wherever I went in the mornings I could hear the soft hammering of the wooden paddle against the clay that had been moulded into shape. A round smooth stone is held by the other hand against the inner wall of the vessel. All the pottery makers are women, and their faces betray much quiet intelligence. The pottery ware of the Papago, though of fairly good quality, cannot be compared with that of the Pueblo Indians, especially in regard to designs. It is useful, though, and finds a ready sale in Tucson.

The Indians who live here number about seven hundred, and they seem contented and happy. One circumstance which contributes to their happiness and gives great cause for satisfaction to those interested in the welfare of the red man, is the prohibition against selling brandy to the Indians. Through the constant vigilance of specially detailed men the law is enforced, at least on the reservation. I was informed that forty-five convictions for the sale of liquor to the Indians had been secured in the Federal Court at Tucson which had just then closed its session. The penalty is usually two years in the penitentiary, together with a fine, and still there are always people willing and anxious to sell to the Indians an abominable, poisonous liquor called "port-wine" at twenty-five cents a quart bottle.

Near San Xavier are five hills, running more or less in the general direction of east and west, of volcanic formation, and dark in color. They are each and all called by the Papago *tjuk* (black). A further characterization is given as to which mountain is meant, by "the black hill where the cemetery is," "the black hill on the other side of the river," and so on. I ascended one of these hills, situated three miles west of the mission church, which, like a great many others of the South-west, is surmounted by fortifications of ancient people. These consist mainly of two rows of stone walls which at short intervals run for about two hundred yards irregularly along the northern side of the summit. The trail from below cuts through them. The walls, four feet high and ten or fifteen feet wide at the base, consist of loose stones thrown together without any attempt at system.

On the top small enclosures, or corrals, of upright, medium-sized stones were noted; here the ancients lived perhaps during sieges, each family in its enclosure. I found later that those Papagoes who lived recently in the sand dune country of Sonora had similar, though cruder, arrangements at their camps. In the winter, when much grass is growing on the top of the mountain, the Indians keep their horses there on pasture. The rest of the vegetation of the hill consists mainly of a bush with almost white leaves, *encelia farinosa*, appropriately named the white brittle bush by Dr. William T. Hornaday. The leaves have the characteristics indicated by the name and, with their stems, have a very strong aromatic odor. The branches exude a yellow gum which the Papago children use as chewing gum, for they indulged in this unattractive habit long before certain classes of Americans included it among the pleasures of life. The men also applied it as a varnish over the painted part of an arrow, warming it first. The rounded and symmetrical shape of this bush is in evidence everywhere in the desert region. The Mexicans call it *herba del vaso*, because the gum is supposed to cure pain in the *vaso* (the left side below the ribs). It is warmed and smeared on, and is considered more efficacious than a porous plaster.

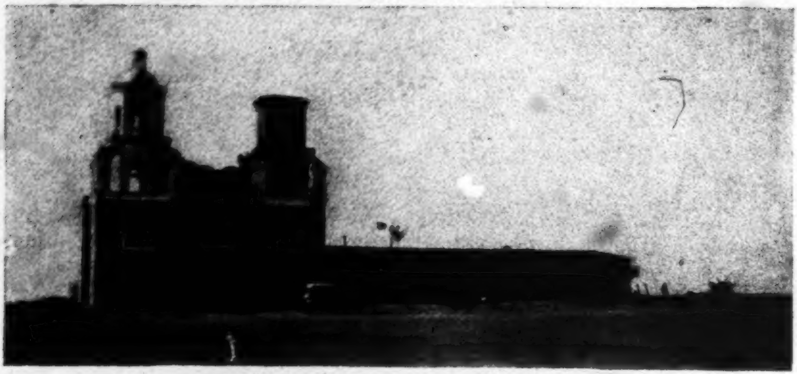
These bushes grow in desert fashion with such regularity of intervals that they appear as if planted, and they covered in a pleasing way the dark sides of the mountain, especially toward the south, where also appeared, here and there, the lofty columns of the giant cactus or sahuaro (*cereus giganteus*). That wonderful creation of the desert, however, does not often inhabit mountains, for the reason that most of their soil has been washed away, but on lesser, mostly volcanic hills like this one, it is seen, though on the south side alone. Dr. D. T. MacDougal informs me that farther south and east in the Sonora Desert, down toward Hermosillo, before reaching the plant's extreme limit of habitat, it prefers to grow on the north side.

The hill notable for its cemetery is much smaller and quite low, and rises back of the Indian houses. The Papagoes wrap their dead in a new suit of cotton cloth, and place the corpse on the ground, building up a small artless stone chamber four feet high over it. In other parts of the Papago country the natives make a hole in the ground of sufficient depth to hold the dead in a sitting position, erecting over it the usual protection. The roof of the chamber consists of mezquite or palo verde poles, taken from the deceased man's own house which, so to speak, follows him to the grave. On top some stones are heaped. Many such chambers are in time joined together and form singular looking structures, ugly and irregular in shape, being at the widest part from twenty to thirty feet across. After the lapse of some time the roof may fall in, allowing a peep down at the desiccated human remains, near which may have been placed objects such as arrow stretchers, plumes, ornaments, and trinkets. I often later saw pottery vessels that had contained food or drink standing near the newly erected chambers. Where there are trees near by, bundles of clothing for the use of the departed in the next life may be seen among the branches. Four thin, upright sticks of ocotillo, which had been placed in a small quadrangle, protruded about one and a half feet from the middle of the roof of some of the chambers near San Xavier.

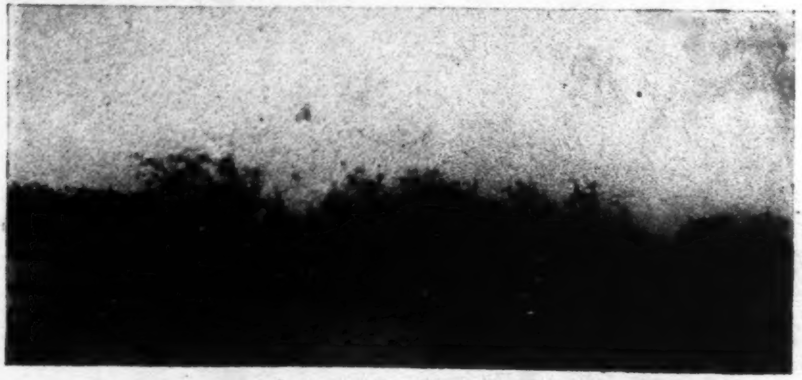
Such agglomerations of mortuary chambers were located on all sides of the small hill, except toward the east, some low down, some high up. I counted thirty-one. Most of the Indians that die in the neighborhood are no doubt still adding to the number and size of these composite burials of the Black Hill Cemetery, though a few make use of the Cemetery of the Baptized, as the Catholic cemetery is called. On the llano, at the foot of the fortification hill described above, is another large heap of mortuary chambers, which the Indians call the Level Ground Cemetery. The dead are never mentioned. The sons, and not the daughters, inherit from the deceased.

Just north of the Indian village, on the east side of the river, are several insignificant looking earth mounds, where pieces of antiquity consisting of stone implements, pottery vessels, etc., are constantly being found in small numbers. Such ancient village sites are common along the river and adjoining arroyos, and in turning up the soil of the river plain the Indians encounter stone axes, etc.

It may be of interest to note that in excavating a dam, fifty miles west of Tucson, a number of ancient earthen-ware and stone implements were found and, with them, curiously enough, two solid balls of rubber, one weighing eight ounces. These no doubt were made from the now famous rubber substitute of northern Mexico, which is produced from a plant called guayule.



Mission church of San Xavier del Bac



A kiln at San Xavier

Threshing wheat. San Xavier

By chewing the leaves and stalks the Indians were able to bring out the rubber. Small quantities of this plant are growing near Tucson.

At San Xavier, nighthawks, also called goatsuckers, flew about in great numbers every evening at the sunset hour, often settling on the ground among the greasewood bushes. As is well known, their call when flying much resembles that of the bleating of a goat, but seated on the ground they would emit an entirely different and pleasanter sound, like that produced by water when being poured out of a bottle, only very much louder. This species was the Texas nighthawk (*chordeiles acutipennis texensis*).

It was the month of June, their mating time, and they were calling out so eagerly that slight notice was taken of my trying to photograph them with my kodak. On horseback they were easily approached within fifteen feet, but it was at first extremely difficult to discover their presence on the ground, so much does the bird resemble its surroundings. Only by paying attention to the exact spot where they had settled could I discover their whereabouts; after a little while the snow-white band under their throats would help to betray their presence.

I was observing through my field-glass how one of them, singing with much perseverance, swelled out its throat each time the note was emitted, its tail and wings trembling simultaneously, when suddenly another nighthawk appeared behind me, darting swiftly past me toward the object of my observation, and emitting at the same time some peculiarly sweet notes. They must have sounded like soft whispers of love, for they were immediately answered by similar notes, but briefer and of a more decisive character, and the bird on the ground was carried into the highest ecstasy. For a second or two the whole bird trembled, spreading out its beautiful tail like a fan and calling out; then it took to its wings and the two flew away in the happy, easy zigzags in which these birds seem to revel.

They settled on the side of a small hill near by. What became of the aggressive female I could not ascertain, but the male continued to sound its gurgling notes, and I approached him repeatedly on my horse as he sat on the shady side of the hill while the sun was setting. The enlargement of the pure white band across the throat made it quite easy to discover him even at a distance of forty or fifty feet, though unfortunately the poor light precluded the possibility of a photograph. I experienced the same thrilling joy in following the birds with my camera as I formerly did when I killed them.

Part of the reservation consists of a large and very fine forest of mezquite trees, some of which have grown to considerable size. The Indians help to supply Tucson with wood from these trees. In making a trip through the quiet woods, I heard everywhere the call of Gambel's quail (*lophortyx gambeli*), the most common game bird in Arizona; also jack-rabbits and coyotes were seen. The mezquites were at their best in their light green, fresh-looking foliage, and on Sundays these woods, which in less arid regions would not be valued very highly, are used as picnic grounds by the hard-working people of Tucson. Lovers of nature find comfort among the trees although they give little shade, but they are the only woods within a reasonable distance of town.

Formerly some magnificent cotton trees, near the Indian agency of the reservation, used to be the objective point of picnic excursions. There were no less than twenty of these old trees that gave splendid shade during the fierce heat of the summer. The crowds, as is their careless habit in America, used to leave newspapers, baskets, and peanuts strewn about the ground, and they would throw empty cans into the alfalfa fields beyond the fence. The owner, much annoyed, posted warnings and prohibitions which were apparently taken lightly; for, finally, to prevent this nuisance, he resorted to the incredibly drastic measure of cutting down those superb trees and making firewood of them.

CHAPTER II

THE PAPAGUERIA—ITS NATURAL FEATURES—SIERRAS AND LLANOS —SMALL RAINFALL—HIGH TEMPERATURE—REMARKABLE ADAPTATION OF PLANT LIFE—FAUNA—THE PAPAGO, THE GREAT PEOPLE OF THE DESERT—FIRST ENCOUNTER WITH THE WHITES—PRESENT CONDITIONS

THE Papago Indians of to-day, the principal natives of the desert, live in Arizona to the west and south-west of Tucson, as far as the Growler Mountains in the west, the Gila River in the north, and the range of Baboquivari in the east. In the neighboring state of Sonora, Mexico, a number of them are scattered, roughly speaking, from the Altar River, in the east, as far as Quitovac and Sonoita in the west, most of them at present living near the boundary line. Until recent times they were found as far as the Colorado River. They occupy much the same land as they did when first discovered in the seventeenth century by the Spaniards. The region was early named Papagueria, or, in its greater extension, Pimeria Alta. It is part of the great arid region called the Sonora Desert.

The main part of the Papagueria slopes down from an elevation of three thousand feet or more, in south-eastern Arizona, slowly, and to the casual observer imperceptibly, for some two hundred miles toward the Gulf of California; its northern part gradually descends toward the Gila River. A striking feature in its topography is a number of minor mountain ranges or sierras, varying from seven to thirty miles in length, and running more or less in the same general direction of south-east to north-west. Their usual elevation above the sea may be placed at three or four thousand feet, although some in the north rise as high as nine thousand, and some in the south are as low as a thousand feet. The mountains have undergone a tremendous erosion and at a distance give the erroneous impression of being entirely devoid of plant life. Often the zigzag profile of their crests resembles a flash of lightning. There is a good deal of mineral wealth in the region, the western Papagueria being part of a great auriferous belt that stretches southward from California and Nevada. Oddly enough, the veins of ore very often follow the same general direction as the sierras, south-east to north-west. The geological formation is granite and recent volcanic.

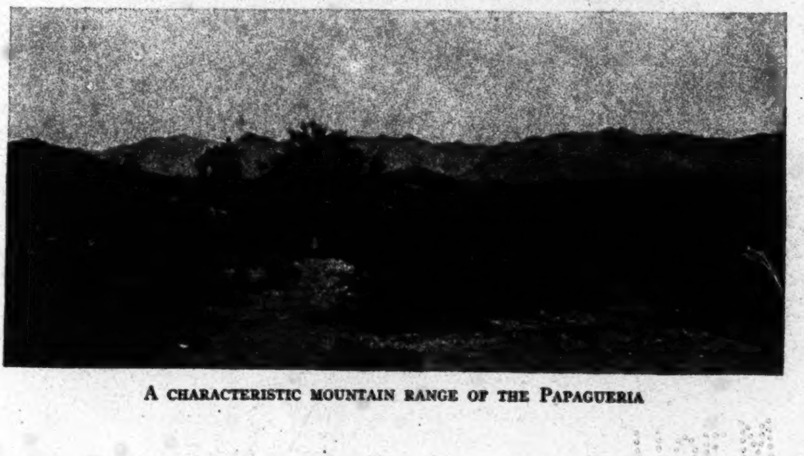
The intervening valleys, or *abras*, as the Mexicans call them, are rather flat, and are formed by the detritus, which is naturally higher and coarser along the mountain sides than in the more central part, where tillable, often extremely fertile, soil is found. Few of the so-called rivers retain water for more than a few hours after a downpour of rain, and the few that show permanent water in certain limited localities, as, for instance, the Santa Cruz River in Arizona, lose themselves in the desert, or, as the Altar and Sonoita Rivers in Sonora, reach the sea only after a heavy rain.

The prevalence of dry arroyos with gravelly or sandy beds is very marked in these valleys, large or small; they are probably evidences of a heavier rainfall than these regions now have. They either join the larger rivers or disappear in sand dunes or playas. Most of the water runs into the Altar and Sonoita Rivers in the south, and some to the Gila River in the north. As so few rivers have a permanent water supply, water has often to be sought elsewhere. In the mountains it is found where natural conditions favor the gathering of rains into kettle holes or sockets, forming what the Mexicans call *tinajas* (natural tanks). They are nowhere common and some sierras do not contain any. In the south-western part of the Papagueria, toward the Colorado and Gila Rivers, such tinajas are the only water to be found. Some last only a few months before evaporating; others, having a capacity of a few thousand gallons, may last a year or two. In the flat "valleys" between ranges, or, to use an equally common expression, on the llanos, enterprising Americans have in a few places sunk wells in connection with mining or in futile attempts at cattle raising.

At Tucson the annual rainfall of the region approaches twelve inches a year, and at Fort Yuma, on the Colorado River, it is not quite three inches. The heat is great during four months of the summer, a maximum temperature as high as 125° F. having been recorded at Yuma. In June the surface of the soil during the day was so heated that I could not stand on it comfortably unless I wore thick-soled shoes. Professor Toumey found that the highest temperature of the soil at the depth of one inch near Tucson reached 113° F. Its average temperature for the month of July was 104.9° F.

SIERRA DE LA BASURA, SONORA. SEEN FROM THE SOUTH-WEST
In the foreground are choyas (*Opuntia fulgida*)

AN EXCEPTIONAL MOUNTAIN RANGE OF THE PAPAGUERIA



A CHARACTERISTIC MOUNTAIN RANGE OF THE PAPAGUERIA

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In winter, as might be expected, the nights are cold, the temperature frequently falling below the freezing-point, but it is a healthy climate and in the Sonora part of the Papagueria, Mexicans have been known to live to the age of a hundred years or more.

The plant life of such a country must present much of interest yet to be discovered. Science explains that plants derive their water largely from a very thin layer of moisture which, by capillary attraction, surrounds and closely adheres to every particle of earth and sand in which the plant is growing. Even after the sand has become perfectly dry to the touch this element of moisture is present, though in a very slight degree. Where the soil is compact this moisture, through capillary attraction, tends to rise to the surface, there to evaporate from the joint action of sun and wind. If, however, the soil at the surface be loosened, the moisture does not rise so high nor so readily. In that way the loose soil acts as a blanket, protecting the deeper soil from evaporating. Methods have of late years been adapted which serve to pulverize the surface, intensifying the action of nature, and putting "dry farming" on a more rational basis. The people of California and Kansas know about this, and practice pulverizing.

Contrary to the popular conception of deserts, the one in question has a vegetation, wonderfully adapted to its environment. During the year I spent there I never saw any plant, bush, or tree suffering from want of rain, in spite of the fact that the winter passed without its customary light showers. Nothing appears scorched from the sun, for desert plants are slow to dry up as well as slow to grow. Next to the healthy though sombre color of the vegetation and the scarcity of trees, that which strikes the observer most when first travelling in the desert region is the isolation of each bush or plant. It is as if they were growing in a nursery. This arrangement is made necessary because the plants need large spaces from which to gather the scanty desert moisture, sending their roots out horizontally all around, or, if they grow in the bottoms of valleys where water is not too far below the surface, sending the roots over fifty feet down to reach it.

Whatever grows is adapted to resist the fierce heat of the summer and the scarcity of rain. With some plants their structure prevents loss of water, others have a means of storing water, which is the case with the cacti, the juicy pulp of which may save the thirsty traveller's life. The water supply stored in the bisnaga, or barrel cactus (*echinocactus*), is enough to keep it in thriving condition for years. There is no need to die from thirst in the desert where this cactus grows. In the coastal region of the sand dune country it is not met with, but it is fairly common elsewhere. Cutting off the head and crushing the inside tissue to a pulp, one may obtain a liquid which tastes something like soda-water. It makes a fair substitute for water, and a canteen may be filled with it, though it does not keep very long; however, a new supply is usually not difficult to obtain. Horses and donkeys also like it. Life in this way may be sustained for many days. I heard of a Mexican woman who, having become demented on account of her husband's death, kept herself living by this liquid exclusively for many months until the authorities took charge of her. Also water may be obtained by making holes in a sahuaro, for instance, by a pistol shot, although it is bitter and unpleasant to the taste in comparison with the juice of the barrel cactus. The flora of this desert, according to Dr. D. T. MacDougal, does not show any structural difference from species of moister regions, although their mode of life is necessarily very different. He points out that seeds of many of them remain wholly inactive during the summer rains that are accompanied by intense heat, and germinate in the winter, while others are unaffected by the rains of winter and the low temperature, and germinate in the summer.

The most common of all the vegetation here is the greasewood (*larrea tridentata*). It is as characteristic of the region as are the many species of cacti and has a much less limited area than the latter. The greasewood belongs to the plains, which it sometimes covers, and gives them the appearance from a distance of vast expanses of yellowish green. It is found even on the coast and in the sand dunes half buried by the sand. People call it useless, but the Indians and Mexicans know better, as we shall see later on. The mezquite, the palo verde, and the ocotillo are all useful trees to the native, while the cacti and certain bushes and plants furnish him with fruits, edible seeds, and vegetable dishes, a few of which are not to be despised by a more fastidious palate.

The fauna of the region includes a great many small rodents, and such large ones as the jack-rabbit and the cotton-tail; further, white-tailed deer, mule-deer, mountain-sheep, the pronghorn antelope, the lynx, the mountain-lion, the gray fox, and the badger, as well as, of course, the coyote. Among the birds may be mentioned turkey vultures, hawks, and falcons, the burrowing owl and other owls, among them the diminutive elfowl (*micropallas whitneyi*), the smallest of its kind in America; further, ravens, four species of quail, pigeons, the roadrunner, the cactus wren, fly-catchers, thrashers, etc. Also aquatic birds, as wild geese, herons, cranes, wild ducks, etc., are seen in certain suitable localities.

It has been found by actual experiment that small rodents of arid regions have been able to live for two or three years on hard seeds without water. The animals of the desert certainly impress one as having made themselves considerably independent of the water question. Holes or burrows in the ground indicating the presence of rodents or of the badger are often found in great numbers miles away from water, the only water being a lonely tinaja in a distant mountain range, of which it would seem strange that they should have any knowledge. With the roving mountain-sheep it is different, although Mexicans and Indians insist that they drink only when rain falls. Similarly, I have it on the authority of an intelligent and observant American in Sonora that while the white-tailed deer in eastern Sonora do, those in its western part do not drink unless it rains, which is apt to be rarely. He has never seen their tracks at the water-holes there, though he has observed them elsewhere and

Mocking-bird (*Mimus*)

Elf-owl (*Micropallas*)

Cotton-tail rabbit

Young gray fox, at burrow

Rattlesnake

often not far from water. Another American of many years' residence, who had shot deer south-east of Libertad, confirmed this. Certain it is that domesticated animals of arid regions are much more enduring than those of moister regions. Cattle will live well for months without any other water than that of the juice of the cacti, which is, besides, their principal means of subsistence. Even horses do not come in to drink of their own free will every day during the winter. In my travels it was the usual thing during the winter time for our animals to go without water every second day; such is the custom of that western desert country and its animals are in surprisingly good condition. On one occasion, in March, our horses and mules, travelling during the day, had no water for seventy-six hours. It was only the horses that suffered and this was more from the quality of the water than from the lack of it. There is one domestic animal, however, man's constant companion, the dog, that declines to adapt itself to desert conditions. Besides suffering from thirst, the hot soil makes its feet sore and it does not know on which leg to stand. Even the dogs of the Indians when travelling, especially in the hot season, remain behind panting in what little shade there may be under the bushes, and only continue their journey in the coolness of the evening.

In such an environment live the Papago Indians, the people of the desert. They are a Pima tribe and speak the same language as the Pima Indians with some variations of dialect. Their number reaches perhaps four thousand five hundred, of whom not over seven hundred live in Mexico. The name Papago is usually interpreted as meaning "bean people." Their tribal name as employed by themselves is *Óotam*, which means "the people." They call the Pima Indians *Ákimuri Óotam*, "river people," referring appropriately to their habitat on the Gila River. The Pima call the Papago *Tóono Óotam*, "desert people."

The early Spanish missionaries were unable to exercise much influence over this tribe. The indefatigable Jesuit, Father Kino, who in the present State of Sonora in 1687 established his first mission, Dolores, travelled much in the Papagueria or Pimeria Alta, as far as the Gila River and crossing the Colorado. He was treated kindly by the Papagoes; but they have, nevertheless, been described by the early chroniclers as wild and dangerous. According to Mr. Bandelier, there is no historical record left of their customs and religion beyond that concerning the prevalence of witchcraft, which is still much in evidence. Even up to recent years the Papagoes made short work of medicine-men suspected of witchcraft.

The topographical position of the missions that were established was such that with the forts, or presidios, they formed a barrier against the Apaches, who were the main obstacle to the Christianizing and civilizing efforts of the Spaniard. Some of the missions of the "Province of Sonora" grew to be very rich in cattle and cultivated lands, feeding, as a recent Mexican author says, "a multitude of pagans who flocked there and helped in the work of the mission when needed." Sometimes the missions furnished the troops with horses. In the Papagueria proper there were well-to-do missions such as Caborca, but the nature of most of that country would indicate that they were generally on a modest scale. There was one in Sonoita and two on the Gila River. In 1751–3 there was a revolt in Pimeria Alta, and in 1840 the Papagoes again revolted against the government.

With the expulsion of the Jesuits in 1767, and later of the Franciscans in 1828, the missions as well as the forts decayed and vanished. Changing political conditions in Mexico also contributed toward their disappearance. To-day the former missions interest few and are left to the archæologist to trace. Such has been the fate also of the missions among the Yaqui, Opata, and Seri Indians.

As for the Papago, the greater part of the tribe never could be induced to live in pueblos, or villages, which was always the policy of the Spanish missionary. In spite of the efforts of the Jesuits and Franciscans, the Papagoes are still living in their *rancherias* as of old, half nomadic in habit, resorting in the winter to the sierras where water is more plentiful and where their cattle, horses, mules, and donkeys find good grazing ground. In the summer they move to the broad, flat valleys to devote themselves to agriculture which is made possible by the aid of the showers that fall in July and August. They do not usually pursue irrigation beyond the diverting of rain water into ditches. In the summer they raise maize, beans, watermelons, and squashes, and in the winter when infrequent light showers usually may be depended upon, peas, barley, and lentils may be planted, all on a small scale, according to Indian habits. Wheat, which is grown in November and harvested in May, is now the most important crop.

By scooping up the earth they make dams in which rain-water is stored for household use as well as for their domestic animals. This is especially the case at the summer rancherias. Of late years they have also taken to the digging of wells, going sometimes as deep as seventy feet, but they have been known to find an abundance of water at a depth of only eighteen feet. Thus the Papagoes, though sedentary Indians, have distinct habitations for summer and winter. The aboriginal name for the summer rancherias is *oóitak*, fields, called by the Mexicans *temporales*. The winter rancherias are called *kíhim*, where there are houses (*ki*), and these might be called villages. In some cases the summer rancherias seem to be considered the more important habitations, and medicine lodges are found at both.

As implacable enemies of the Apaches, the Papagoes were of some assistance to the early missionaries in helping the presidios to fight their savage foes, and they have several times, says J. F. Velasco, presented the government with ears and scalps of Apaches they had killed. Their innate enmity to the Apaches later gained them the favor of the Americans, who received their valuable assistance in campaigns against these marauders. They also gained the good-will of the Mexican Government by assisting in the war against the valiant Yaqui Indians.

It has been the good fortune of the Papagoes to live in a country which the white man as yet has not found it profitable to exploit by cattle raising or, still less, by dry farming. Therefore, they have so far been left alone in their native country, and besides they have even come into possession of a few wells which the Americans dug in their efforts to redeem the land. These natives are thus better situated than most of the tribes of North America.

The Papagoes are above medium height, rather dark in color, and of splendid physique. The women are inclined to be stout. They are a peaceful but at the same time courageous people and show much intelligence. They are hospitable, as becomes a desert people, and if food is being prepared in the house when a stranger comes, some of it is offered to him, be he Indian, Mexican, or American.

In the central part of the Papagueria, especially in the large valley of Santa Rosa and the adjacent Quijotoa and Comobabi ranges, they live happy days without much interference from the whites. Some of the summer rancherias astonished me by their extent of land fenced by wooden piles and poles, but in outlying districts many are forced to seek work from the whites, by whom they are much valued as laborers in the making of railroads, irrigation ditches, and in mining. The part of the tribe that lives in Sonora is much more disrupted; they have lost most of their lands and are largely servants of the Mexicans, doing efficient work as *vaqueros* (cowboys), miners, etc. The Papagoes also know how to "dry wash" gold at the placer mines, many of which are found in Sonora, and the discovery of one or two large placer mines has been due to these Indians.

The Papagoes are by no means badly off, as a rule, and they manage to make a good living where, so far, the white man's efforts have failed. Their herds, adapting themselves to the arid conditions, are increasing and making the Indian prosperous and comfortable. Good mules now carry burdens which his wife or he himself formerly had to toil under; cheese is made from the milk of their cows and sold or used for their own consumption, and, above all, they have wheat and maize in sufficient quantities to last them all the year round. They also have wheat and occasionally some head of cattle to sell, obtaining in return commodities of civilized life. The white man's kitchen utensils are being acquired, and the women have begun to find it more convenient to use flour than to grind the grain on the metate. No native race, though keeping its language, can help changing its ideas under such conditions. In a very few years there will be no more interest attached to the Papago than to the native descendant of the once proud Aztec in the suburbs of the City of Mexico.

Although the Papago in Arizona always insists upon speaking his own language, still he is rapidly losing his aboriginal beliefs, customs, and habits; even basketwork, for which the women of the tribe were noted, is falling into decay. Both in Arizona and Sonora the Indians have completely adopted the white man's garments. Some old man may still be found in the more remote parts wearing his aboriginal apparel, consisting of a breech cloth around the loins, but this is getting to be an extremely rare sight, and it must be confessed that the ready-made blue overalls of the white laboring man of the West, the colored shirt, a picturesque neckerchief, and gray felt hat with straight brim are quite becoming to the young bucks with their superb, lithe, and supple figures, with somewhat narrow hips. No man wears his hair long any more, but tattooing marks in the face are still seen on men and women of the former generation in the Santa Rosa valley, where ancient customs and beliefs have been preserved longer than anywhere else. In this extensive valley are also found the most important rancherias.

I was glad to have visited these Indians while there was still something of the ancient atmosphere left in the more remote parts of the Papagueria. The fact is that these decided changes in the conditions of the Papago have come about comparatively recently, perhaps during the last thirty or forty years. As Mr. Bandelier, the great authority on the history of the South-west, truly says, the ethnography of Arizona has not changed much since the year 1600. The Apaches by their raids altered tribal relations, but the change that most concerns us here is due to the settling of the country since its annexation by the United States, and in Sonora to the discovery of gold. Though possibly originating in a less arid region, the Papagoes, in relation to their environment, ought to be a no less interesting study than the country itself.

CHAPTER III

AN EXPEDITION INTO SOUTHERN ARIZONA—MY COMPANION—THE RANGE OF BABOQUIVARI—FRESNAL—PAPAGO MANNER OF CURING DISEASE—AT THE BOUNDARY—AN UNUSUAL RELIGIOUS COMMOTION—VISIT TO A SACRED CAVE—INDIAN OASIS

ON June 20 I started from Tucson bound for a journey of exploration of that part of Arizona which is occupied by the Papago Indians. My sole companion was José Xavier Pablo, a full-blooded civilized native of that tribe, twenty-six years old. He had learned carpentry in Tucson, in which he was as proficient as any white man. He was also a painter and plumber; in fact, he could turn his hand to almost anything of a practical nature. Thus, assisted by two other Indians, he had put up the telephone line between Tucson and the Presbyterian Mission School, which he had frequented for nine years. He furnished his own wagon and two hardy horses bred in the desert, and before starting he shod his horses himself. Pablo also served as my interpreter. He was intelligent and reliable, besides being of an unusually even temper; during the two months we travelled together, I do not remember ever to have known him cross or to lose his temper.

In addition to the usual provisions, we had two canteens of the generous Western size, each capable of holding two and one-half gallons of water, and also one of smaller size. Of course, the water barrel on the side of the wagon was not wanting; also rifle, shot-gun, and riding saddle were taken along, not to mention photographic cameras and the necessary scientific instruments. In the outskirts of Tucson, near an old mill, we filled our barrel and gave our horses a good drink at the clear, smooth-flowing stream of the Santa Cruz River, which was in such a delightful contrast to the arid landscape.

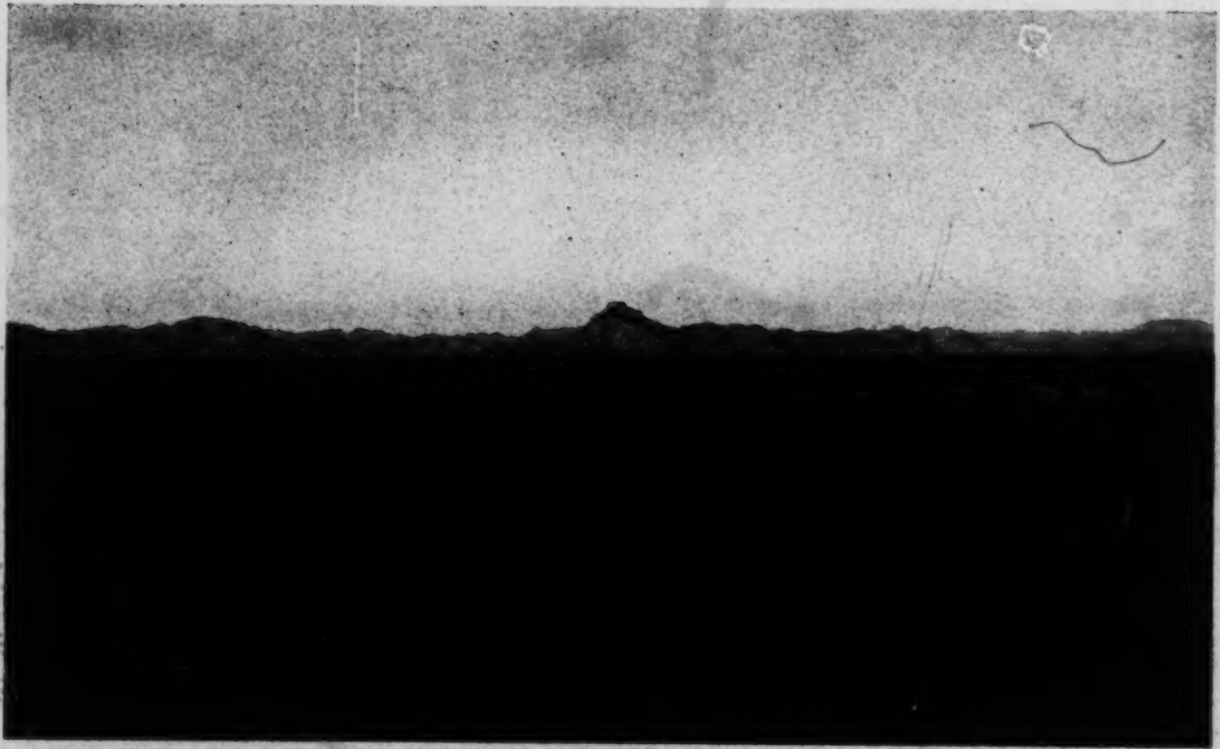
It had been my intention to go down first along the eastern side of the Baboquivari Range as far as La Osa Ranch, but the road turned out to be sandy and heavy, and I was obliged to return and limit my initiatory journey to travelling along its western side. A happy-looking Papago family from the suburbs of Tucson passed us on their way to the sahuaros (giant cactus); they were going to spend the *Dia de San Juan*, midsummer day, in the country picking the much coveted fruit. An Indian on horseback was on his way to the hot city, Tucson, for the same celebration. Everyone to his taste!

Baboquivari is the familiar name given to an extensive range south-west of Tucson. From its central part rises a peak of somewhat striking shape which gave origin to its name, Baboquivari being a Spanish corruption of the Papago name Vavkívolik, meaning: "mountain (*vav*) narrow about the middle (*kívolik*)"; seen from the south, the almost perpendicular sides of the peak appear slightly drawn in at the base. The peak, rising nearly fifty miles south-west of Tucson as the crow flies, can be seen from a great distance, from the neighborhood of the Jack-rabbit mine and the Ajo Mountains in the west, to Altar, Sonora, in the south. Prof. R. H. Forbes, of the

University of Arizona, in July, 1898, succeeded in ascending it, and by an aneroid barometer the height was found to be 7,850 feet above sea-level. The ascent was made from the west side, and, to quote his own words, "the extreme top of the mountain is a gentle oval about a hundred yards across. From this lofty vantage the eye sweeps over about three hundred miles of a terrific and almost untouched wilderness of rocks." There is a small pool on top which holds a few gallons of water after rain. In rainy weather, water drips down on the north side five hundred feet below the top, where several small pools were seen.

It is perhaps at the latter place that the pond is found which is called by the Indians Vĭikan Shóotak, "Lasting Water" (*shóotak*, water), and which in the belief of the Indians was left by the sea after the deluge. At the time of the making of sahuaro wine for their great feasts of the summer, people go up there to get some of this water, after having first sung to it, to use in the wine making.

On Friday, June 25, we approached from the west the large rancheria called Fresnal, situated among the foot-hills below the peak of Baboquivari, which looked more magnificent from that point of view than from any other I have seen. The air was very pure and transparent, and I took a photograph of the peak at half-past five in the afternoon. Just as I cast a glance backward, before making a second exposure, I was astonished to see that the region toward the west and south was hazy, and I had scarcely time to make the exposure when the haze and a light wind, moist from the sea, arrived. A



Peak of Baboquivari, seen from north-west

few minutes later the Baboquivari Range, at a distance of ten miles, was enveloped in a light fog. The change was not only seen but felt, the temperature fell, and the moisture of the air was very perceptible. As the wagon was heavy and the road led uphill, it grew late before our arrival, but the moon was half full, so we found our way easily in the now quite chilly evening. The spell of extremely dry air was broken and the season of rain showers approaching.

We made our camp next to a big mezquite tree on a slope among the ranches. The weird singing of a medicine-man sounded through the greater part of the night. Few are those Papagoes who have lost faith in their own doctors, and even the so-called policemen turn to them for relief if anything ails them.

Fresnal consists in reality of three rancherias, and we found ourselves in the middle one. They are pleasantly situated among the foot-hills and look like villages. The name is derived from some ash trees that grow in the arroyo, the native name having the same meaning. Naturally, the rainfall is greater here in the mountains than on the llano and, according to local accounts, the arroyos at times run a whole day. Occasionally the water is six feet deep. The Indians say that the arroyos here carry water to the Sonoita River.

The Indians of Fresnal are well-to-do; three or four of the men are reputed to own as many as two hundred head of cattle and fifty horses each. Wagons and good horses were seen, and there were plenty of chickens about. Men and women, especially the latter, looked in good condition; the young men were not particularly accommodating, as their interest seemed to be centred in the corral, where they were breaking in horses, separating cattle, etc. These natives had little to sell me beyond a fine basket used for harvesting sahuaro fruit. This kind of basket, which now is becoming rare, is of large size, water-tight, and is carried on the head. Its decorative designs sometimes represent the sahuaro cactus.

I visited Santiago, an old hunter, who, according to reports, used to be able to overtake deer, on the run, in half a day, and then shoot them with bow and arrow. In the hot weather these animals are not inclined to run long, as their feet become sore. Santiago is still very agile and quick in his movements and every day he goes out shooting quail, cotton-tails, jack-rabbits, and pigeons. His bow, which I secured, is made from that beautiful greenish blue bush of the desert called *condalia*. It is strengthened by an ox-tail hide pulled over it. The bow string is made from the ligaments of the back of the neck of the same animal. Arrows are made from the *amole* (yucca) flower stalk, the point being of cat-claw, tied by deer sinew.

He was also willing to be photographed. He had been to Tucson and there had gone through the experience of the camera, so he had no objection but would expect some gratuity. I took three or four snapshots with my kodak, and he asked fifty cents, which I gave him, but he demanded fifty cents for each exposure, in which I could hardly humor him. The Papagoes all have a great disinclination to being photographed, and look upon it as being worth a good deal of money to the one who submits to the operation. His bow and four arrows, the result of much labor, he sold for $1.25. I gave him some tobacco, candy, and raisins, and we separated great friends.

In the afternoon I arrived at a house outside of which an old medicine-man, Castillo, was singing to soothe a patient, a middle-aged, powerful looking man who was lying on his back in front of him. His singing was accompanied by the rasping of two sticks; one end of the notched one he held by his left hand, while the other end rested against an inverted basket, and he drew the rasping stick each time up toward him and then down, the opposite movement to the one which we should use to produce the same result. Near the basket on the ground an effigy of a horned lizard had been placed; it was made of wood and daubed with ochre, its head turned toward the patient.

Some Indians came up smiling as if they wished it to be understood that they did not believe in the performance, for they knew that white men laugh at this. One of them obligingly brought me a basket for sale as well as three small ancient objects, a flint arrow-point, a spinning whorl, and a small perforated stone disk, all threaded on a string. In the meantime the medicine-man, whom I watched from my horse, was finishing his treatment by placing the effigy repeatedly on the patient's leg, breathing and blowing at the same time. The man had a pain in his leg which had been caused by a horned lizard, for, according to Papago beliefs, all animals have the faculty of making people ill except the deer and the pronghorn antelope. To relieve the illness the doctor had sung a song to the animal, asking it to take the pain away. He then walked into his house; somebody must have told him that I was a *makai* (doctor, medicine-man), for a few minutes later, to my surprise, he brought out his medicine basket, easily recognized by its long shape, and came up to me. We sat down on the ground; he took off the cover and began to unpack the contents of his tray.

Many people gathered around us and the sick man half rose from his mat in order to turn around to see who the stranger was. There were many remedies of a similar character to the one just described. Images of certain animals, accompanied by appropriate ceremonies and exhortations, are thought to relieve ailments. Like the native doctor himself, an animal is thought to be able to cause illness as well as to cure. The turtle causes stiffness, the butterfly produces vomiting, and the badger gives backache. The deer makes persons cough, and their voices weak, and may give consumption; but a deer-tail, placed on a stick and manipulated in the proper way by the medicine-man, will cure that illness, for, as Castillo added by way of explanation, "it is not often you see the deer thin." A piece of clay taken from a gopher's burrow is used against excessive menstruation or stomach pain. The sun is apt to give fever, and a patient suffering thus is relieved at sunrise; during the incantations of the doctor a small wooden image of the sun rests on the ground, while the patient faces the east.

The old man seemed glad to explain everything. He was also willing to sell me some of his treasures. One of them was a medicine-man's plume consisting of four eagle plumes tied together so that they diverged two by two. When used, these are held by the quill ends as a handle and moved in the air forward and backward as if dusting an object. When the young girls come of age they are "dusted" in this way from all evil. The implement was new and well made, and I wanted to buy it. "The plume is very valuable," he answered; "with us it is at least worth as much as a horse or a cow." He would, however, make it easy for me by letting me have it for $2.50. I presented him with a pouch of tobacco and a handful of candy, the cause of much interest to his little grandchildren who had been clinging to the good-natured old man all the time that he was explaining. He also promised to show me the so-called Montezuma's Cave, in the peak of Baboquivari, some day.

In a light wagon which Pablo borrowed we started on an excursion south, to be possibly extended beyond the border to Pozo Verde. The day was moist and warm. We passed several extensive summer rancherias or temporales as they are usually called. The rude fences of mezquite looked substantial and the Indian ranches gave an impression of prosperity. At two places there were dams also fenced in, but they were empty; they had been made by scooping up the rich soil with scrapers and horse-power. The water in such ponds lasts only three or four months and is not for irrigating purposes, but solely for the use of men and beasts. The

Papagoes do not bathe in them; during the rains they get their baths in the arroyos, men and women bathing separately. There was not a soul to be seen anywhere, as the Indians were still at this time, the end of June, in or near the mountains with their cattle and horses.

From a lately established summer rancheria, called San Miguel, southward, the country assumes a different aspect, forming beautiful grassy plains or downs. The mezquites, far apart and small, take the place of greasewoods and the cacti have almost disappeared. There was an abundance of very dry grass of a whitish yellow hue. As the air was laden with moisture, it was to be expected that the coloring of sky and mountains would be fine toward sunset. The western sky beamed with the translucent color of light yellow or orange, while the mountains, which during the glaring light of the day had shown no color beyond a dull gray, appeared deep blue. Much more intense than the air-blue and complementary to that of the setting sun, the color extended to all the mountains around the great *bajio* (basin), while at its western edge a long narrow strip of light green, due to an unusual growth of mezquites, added to the variety. To most people it is not apparent that there is much coloring in any landscape except that caused by inherent qualities, as by vari-colored leaves of trees; if they would lie down on the ground and view the scenery horizontally, they would probably have their eyes opened from this unusual vantage point.

There is a well fifteen feet deep at a lonely Indian ranch just on the border, but as the place was found to be temporarily deserted, and there would be no one to look after our wagon, we had to abandon our intended trip to Pozo Verde, the largest Papago rancheria at the present time in Sonora. Its name, Green Spring, has the same significance in the Papago language, and the locality is important in the native mythology. Baboquivari rises about a thousand feet above the llano near the boundary line, losing itself in Mexico in low ranges and mountains.

On our return we made a dĕtour into a rancheria called Sepánóvak ("Smell of the Coyote"), which was situated in a narrow valley of the Baboquivari Range. It had been settled of late years and was small and unattractive. Discarded clothing was lying about, and the inhabitants looked like poor white people, although they owned lots of live stock. Judging from the fine looking fat horses and cattle down on the plains, a different opinion would have been formed of the owners; it was something like the disappointment one feels when a smart turnout of horses with driver and footman discloses ordinary-looking people inside the carriage. Natural and harmonious conditions are the only ones that count in life.

One interesting family, that of Ramon Cachora, lived a little further up the valley from here, he, his two sons and his son-in-law having been leaders in a religious movement of a white man's stamp. They were so-called educated Indians, and a daughter of his had been to Carlisle. It was an anomalous case, for, strange to say, they had become converts to the revivalism of the prophet Dowie, who a few years ago made such a stir in various parts of the United States. One of his agents, a lady in Phœnix, had been instrumental in bringing this about.

To understand this conversion, it must be remembered that all Indians are of a religious disposition. In their aboriginal state, while never giving up their own beliefs, the Indians have little objection to any foreign creed; the more religion the better for them. They are quite sincere about it. When these Papagoes heard of the strange teaching of the modern Elijah, it appealed to them. The world was coming to an end and they were going to get ready; people sold what little they owned and settled in the Comobabi Mountains awaiting the arrival of the new Messiah. There were from forty to fifty souls all told, men, women, and children. Ramon Cachora, who was well off, sold his two hundred head of cattle; he became the leader and they sustained themselves mainly with the proceeds of this sale. There was no white man with them. They had everything in common and their rules were strict; brandy and tobacco were forbidden. Sometimes they had services lasting the entire day. For three years they waited for the Messiah to come; then hunger broke up the sect.

A herd of horses and a number of cows, many with calves, that had come in to drink the night before, walked off again in the morning to pasture in the plains some six or eight miles away. I asked a man how long a time it would be before they returned and he answered: "A few will come next day, most of them the day after to-morrow in the afternoon, and some will not return until the third day." It was the hottest time of the year—the end of June.

Three miles from here, just about where the llano begins, there rises a small hill, four hundred feet high, called La Ventana. On the west side it has been fortified by the ancient people with half a dozen or more stone walls of the usual description. The walls are perhaps more massive than is the case at most places. The fortifications had a remarkably fresh look about them, as if they had been in recent use. On top, where blocks had been broken off to form walls and parapets, the underlying rock still looked as untouched by the hand of time as if the work had been done within two years. Circular or square enclosures of the usual type are seen on a natural terrace near the top. A fairly well constructed track leads up to the summit where a rattlesnake was resting in a cool cavity. A ground-squirrel was noticed, and on the hill-side two camping places of the gray fox were observed, each under a small bush, the ground having been worn quite smooth.

The vast plain is impressive from the top; the ranges, enveloped in a blue haze, appeared small, Comobabi and Quijotoa in the north-west being the nearest. To the right of the Comobabi Range, in one place only, toward north north-west, the view was unobstructed as far as the eye could see. In the south-west the small hills near Sonoita were visible. The many arroyos on the west side of the Baboquivari Range are worthy of note; they are short, quite deep, and impossible for wagons to cross until they widen out into the plains. For this reason the road, such as it is, from Fresnal southward makes a détour west.

At the well of Fresnal our horses, having been without water for twenty-two hours, each drank nine bucketfuls. The bucket was not large, but contained more than a gallon. A visit was made to the so-called Montezuma's Cave, once sacred to the Papago as the principal habitation with which tradition credits Sīhu, also called Īitoi, the most important mythical personage of the Papago mythology, being their elder brother as well as creator of the world. The cave is called Elder Brother's House (in Papago, Sīhuki; *ki*, house). It is situated at six miles' distance from Fresnal. We climbed nearly one thousand feet, and on the south side of a hill, below the peak, our guide, the medicine-man, pointed out the entrance to the sacred place, half hidden among bushes.

It was closed with a wall of loose stones and was so small that a man could only squeeze through with difficulty. The cave was found to be spacious and well formed. At one corner was deposited several hundred arrows, upright in a bunch, with nothing but the wooden part remaining. No flint points were visible. There is another cave on the east side of the Baboquivari Range, discovered lately by Mr. Jefferson Milton, where a considerable number of obsidian-tipped arrows were secured, one of which is reproduced at page 96.

Though a few showers had fallen lately, still no grass had yet made its appearance and travel began to be difficult. The Indians had very little to sell in the way of

Peak of Baboquivari

Ocotillo (*Fouquieria splendens*)

Entrance to the sacred cave, at foot of peak of Baboquivari

Barrel cactus

straw, barley, or wheat, the usual feed for animals. If our horses had not been hardy creatures of the desert, we should not have been able to move about much at that time of the year. I decided to return to Menager's store, at present called Indian Oasis, where we might succeed in securing forage.

A Papago was an efficient clerk in the store. Near by was a small village of civilized Indians; the women, who had been to school near Tucson, after a while responded in English, very softly spoken. A phonograph, which was the only one I saw in the Papagueria, was produced and operated for my entertainment. Many Indians came into the store from the neighboring country. As they were not in the habit of carrying provisions, they were hungry and looked it. I treated them to a generous breakfast and my reward was the information which they volunteered concerning one of their festivals, connected with the gathering of the fruit of the sahuaro, the giant cactus. It was to take place the next day at a rancheria called Noria, situated in the Comobabi Mountains at no great distance, and I decided to go there.

Opportunely for my journey, in the evening of July 4 unusually heavy rain fell during forty-five minutes, the storm making short work of my tent which I decided to leave behind here on account of its being so large and inconvenient. Nearly an inch of rain must have fallen, bringing about in this brief space of time a remarkable change in the appearance of the landscape. The dry creek ran with water and the playa below was changed into a shallow lake, the frogs filling the air with their loud, welcome voices. Next day in the afternoon we pulled out, though the ground, soaked with water, made travel heavy. Our wagon was stuck for half an hour, but after that we made our way fairly well, for the night's rain was found to have extended only a couple of miles westward. We arrived at our destination at dusk.

CHAPTER IV

THE GIANT CACTUS OR SAHUARO—THE SAHUARO FEAST AT NORIA—DANCING AND SINGING—THE MEDICINE LODGE—TOBACCO WELL RECEIVED—DISSERTATIONS WITH THE INDIANS—AN ADVENTURE—AN ANCIENT FESTIVAL—NATIVE ORATORY—OBJECTION TO PHOTOGRAPHY—ARTISTIC GIFTS OF A NATIVE

THE giant cactus (*Cereus giganteus*), or sahuaro, which is the direct and indirect cause of such festivals as the one we were to witness, is by far the most noteworthy representative of plant life in the desert, being, in fact, one of the most remarkable plants on the globe. It reaches a height of forty to fifty feet, sometimes even more. At times the sahuaro appears as a single trunk, like a column, but more often branches of nearly the same thickness protrude from it, stretching upward arms lifted as in appeal. The evergreen trunk and branches have deep longitudinal furrows or flutes, armed with spines and wonderfully adapted for retaining moisture. Acting in a manner similar to that of the bellows of an accordion, these close together during drought and open again to receive moisture.

It avoids the great belt of sand dunes that stretches along the upper part of the Gulf of California, from Port Lobos westward, and ceases to appear south of the Gila Range and Sierra Blanca. Often a single column, the only one on a whole mountain, appears on top, resembling a sentinel on guard. At other times such a single column has found the means of existence on some terrace on the mountain side, reminding an imaginative traveller of the ruins of a temple in Greece. Along the mountains east and south of Sonoita, Sonora, this cactus attains its most luxuriant growth. Here as well as near other ranges impressive forests of these gigantic, singular structures of the plant dominion appear, calling to mind creations from the carboniferous period.

In May the tips of the trunks and branches produce a multitude of superb cream-white flowers. Toward the end of June the famous sahuaro fruit appears, the size and shape of a large hen's egg. A spiny skin which is easily removed protects the juicy, crimson, and fleshy substance in which numerous black seeds are imbedded. Although possessing not quite as much flavor as the related and more famous pitahaya fruit of Mexico, the sahuaro is a palatable relish in the excessively hot and dry climate, containing also, like the pitahaya, considerable nourishment.

The violent storms of the desert make no impression on the giant cactus. However, one wonders that it can exist at all, since the fruit and the plant itself prove in many ways such an attraction to animals. As soon as the sweet fruits ripen they are attacked by birds, while those that fall to the ground are eaten by hungry and thirsty animals, which prevent the seeds from germinating. The woodpeckers make large cavities in the juicy pulp of the trunk, the plant protecting itself by growing a hard tissue all around the cavity, in which various kinds of owls, falcons, and fly-catchers make their nests;

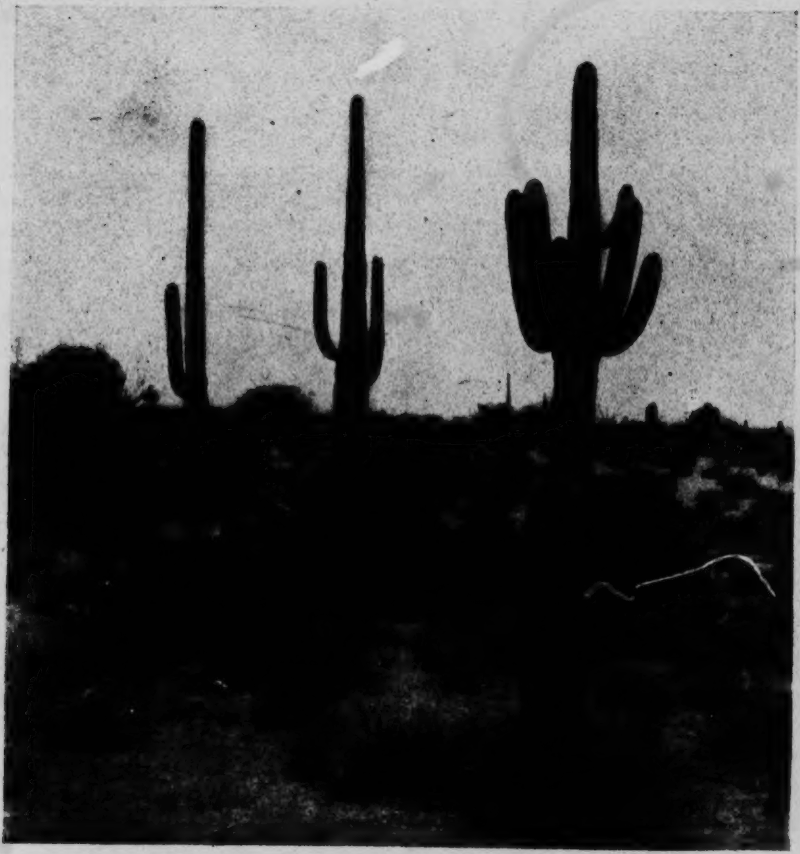
here also bees deposit their honey and bats make their homes. Sometimes rabbits attack the stem to get at the juicy pulp.

To the Indians the sahuaro is invaluable, and by tacit understanding they consider it a crime to cut one down. The grateful fruit comes at a time when most needed, and the Indians leave their habitations to camp among the sahuaro as long as the season lasts. Not only does the fruit then furnish them with their principal means of subsistence, but the greater part is boiled down to a sirup for future consumption in the winter, serving also as material for an intoxicating drink, which is used at the sahuaro festival. The seeds, too, are eaten after having first been ground on the metate, and they taste better than would be expected; the Indians also feed their fowls with them and many sackfuls are brought back to the houses after the sahuaro harvest. The wooden skeletons or ribs of the sahuaro furnish the Papago with light, strong, and elastic building stuff, and from the same material he makes the long stick which is needed to bring the fruit down from its lofty elevation, coloring the pole red with the juice of the fruit. Also chicken coops, chairs, traps, and similar articles of the household are manufactured from sahuaro ribs. Even the wooden tissue bags produced by the woodpeckers are made to serve as water bottles or drinking vessels.

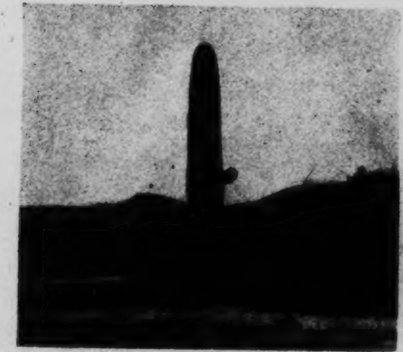
So important a part does this cactus play in the life of the Papago that their year begins with the sahuaro harvest. The season lasts from the middle of June till the middle of July. Every rancheria is supposed to make a feast for the occasion, which will insure rain and good crops. An essential part of the festival is the drinking of wine, produced by mixing the sahuaro sirup in a certain proportion with water and allowing this to ferment. The name of this greatest festival of the year is *navaíta*, derived from *návait*, their word for the wine.

Elder Brother, so their tradition runs, created the sahuaro by placing beads of his perspiration in the ground. He walked in ceremonial circuits around it for four days, and the plant began to give fruit. He also made a jar in which he put the juice of the fruit which he mixed with water. "Let us see if we can not make rain with this to refresh the thirsty soil," he said to the jar. And its contents became wine, and it began to rain, as he thought it would. Therefore, to this day, the Papago make sahuaro wine and celebrate a great feast in accordance with Elder Brother's commandments. The wine was given by him in order that they might get drunk, and then rain would follow.

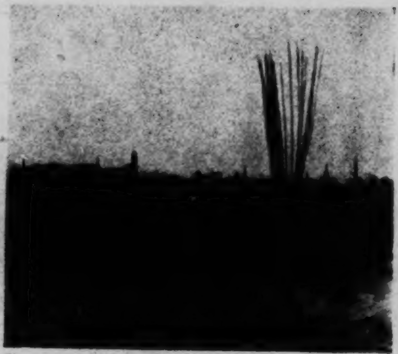
On our arrival at the rancheria of Noria we learned that the wine making had been started that morning. The festival was to begin in the evening, the singing and dancing lasting as usual for two nights, by the end of which time the wine would be ready for consumption. An hour after dark, as we were preparing our supper, a loud Indian voice from the other side of the arroyo on which we were camped sounded forth in the dark, still night, inviting people to gather for the festival. Standing in front of the medicine lodge, facing the east, the herald announced over and over again: "Darkness has



Sahuaro, or giant cactus (*Cereus giganteus*)



Single-column sahuaro



Sahuaro, dry, showing its wooden structure

already covered us a good while, it is now time to begin to sing and dance, and everybody bring tobacco."

We had three Indian guests at our meal, and afterward we all went over to the dancing place, or, as the Indians call it, the singing place (*njúikot; njúi*, sing), a level piece of ground always found in front of the medicine lodge. In the dim light a long string of eagle plumes hanging across the space between two upright poles from east to west could be discerned. Near the western pole a solitary fire was burning; two medicine-men were sitting there with their backs turned toward it and facing the east. Behind the fire, in the west, was the lodge, and in front of this stood a jacal, the light shed invariably seen near the dwelling or lodge. They sat there immovable in mystic contemplation of rock crystals and queer objects which were spread before them on the ground, and by the aid of which rain is procured; among them, my informant said, was a small stone, translucent and bright, which few have seen. If rain is not near, the stone is very warm and has to be cooled and purified, an operation which the medicine men were about to undertake.

My attention was next attracted to a long basket of enormous proportions placed between east and west on the ground at the foot of the western pole, near the doctors. It was of the same oblong shape as the ordinary medicine basket of so many tribes, and serves as a receptacle for the sacred paraphernalia of the lodge. Here the string of eagle feathers hanging near by is kept during the year. It is provided with a cover of the same material, considered by the Indians as its blanket, which, when the basket is in use, is placed on the ground for it to "sit" on.

Around these holy men and the fire and the long string of plumes that stretched across, danced men and women, holding each other by the hand and moving around in a circle. They marched in time, with firm steps, placing left foot behind right, and proceeding in this way against the sun's apparent movement. They all sang in unison and in time with their steps, the leader swinging a rattle, and he and those nearest to him exerting their lungs to their fullest capacity. There were always two or three walking ahead of him, as everybody was eager to be near the leader in order to catch the tune. In this advance guard there was also a female leader, a soprano. What a wealth of songs there is among these Indians! During the two nights new songs were presented all the time, not only new texts but even new, though somewhat similar, melodies. People were sitting or lying around the circle of dancers, stepping into it whenever their fancy moved them.

When four songs had been sung, taking about an hour, a short pause was made, and the performers would sit down, many of them smoking. After a few minutes, only the leader would rise, and, standing in front of the jacal with his face toward the east, he would sing one verse of the song they were going to take up next, this time in a low voice, just to refresh their memories. Then he would step forward, dancing again and bursting forth into loud singing, immediately joined by the multitude in their enthusiastic efforts to make an impression on the gods.

The next morning, when I went to inspect the place in daylight, I found the leader and other functionaries sleeping peacefully on the ground under the jacal in front of the lodge, tired from their exertions of the night. I was permitted to enter the lodge, where large earthenware jars were standing full to overflowing with the precious sahuaro fluid. A slight cavity had been dug in the ground for each jar, serving as a receptacle and covered with branches of greasewood upon which the jar rested neatly. The reason for this arrangement, according to the Indians, was to keep the fluid warm and because they had always done it in this way. Heavy spume was rising from most of the jars, showing that fermentation was taking place. A fire was kept up in the lodge in order that the temperature of the air should be even and favorable for fermentation. The solemn function of mixing the sahuaro sirup with water takes place in the morning hours under the jacal outside.

The lodge was a circular, dome-shaped grass hut, the ancient form of Papago habitation, examples of which are still frequently seen in the central part of the Papagueria. The lodge, however, is larger than the dwelling-house, hence its name Kûki, "Big House." (*Ku*, big, large.) This was rather a small one, twelve feet in diameter and six feet high, and scrupulously clean inside. The framework of these primitive houses consists of mezquite posts; from two to four forked uprights in the middle support the dome-shaped roof, which is made of sahuaro ribs, surmounted with greasewood twigs and some large coarse grass called sacâte colorado. The grass is kept in place by hoops of ocotillo inside and outside, placed at intervals of eight or ten inches. The top of the house is covered with earth.

The entrance is small, usually only two and one-half feet high and two feet wide, and is provided with a grass door which, when not in active use, leans up against the wall outside. To get in or out one is obliged to crawl on hands and knees. The fire is made in the centre, and there is no other escape for the smoke than the door, there being no window; as the people inside generally sit on the ground, the smoke does not trouble them; besides, as the house is warm, a large fire is not needed. In the summer these dwellings are delightfully cool, affording also excellent protection against the violent, though short-lasting, rain-storms of the desert.

Usually a light stockade of ocotillo and other kinds of poles runs around the lodge to prevent the cattle from eating the grass of which it is made. In this house the youth are instructed in the traditions and beliefs of the tribe, and here is discussed everything of more or less importance, meetings being held every evening of the year. The man who is in charge of the lodge and its sacred objects is elected for life. He lives near by and is called Keeper of the Smoke, which means tobacco smoke. The name for tobacco is *viv;* when used for certain sacred purposes it is called coyote tobacco (*pan vívuka*). The young plants are covered with greasewood branches, but the Papagoes nowadays rarely grow the weed and usually commercial brands have to be resorted to. It is smoked in corn husks. The leaves of *viopóli*, a bush in the foot-hills, are also sometimes smoked.

In the afternoon the leading men began to wake from their slumber and, as there were many features of the feast I desired to have explained to me, I induced them to have a conference. Outside of the house of the Keeper of the Smoke there was some convenient shade and, stretched on a mat with the rest, I had a couple of hours of very interesting conversation. Many years amongst the Indians gave me some knowledge of the fundamental traits of their religious ideas, which evidently very much surprised those present. They had such fine faces, full of determination and sincerity! Ragged and poor though these people were, I could not help admiring the expression of their countenances, especially those of the principal men, flushed with enthusiasm attendant on the festival. They gave me clear and unequivocal answers. When I had finished all my questions one medicine-man said: "I suppose he is one of those white men who want us to give up all our ancient beliefs and customs." Assured on this point, they said they were glad to have me remain at the rancheria as long as I wished. They also informed me of a calendar record preserved by a man who lived in the Baboquivari Range. Of this I made a note as the object for an excursion.

"Might I see what was inside the long basket on the dancing places?" I asked. This they could not very well do. Few of the Indians themselves had seen it, they said, and they were not in a position to show me; perhaps the makai (medicine-men), who were coming to-night to tell when the rain would arrive, would show me. But to see those things was a risky affair, connected with possibilities of harm to the beholder. As we were returning to camp Pablo said to me: "Probably those Indians never before spoke like that to a white man."

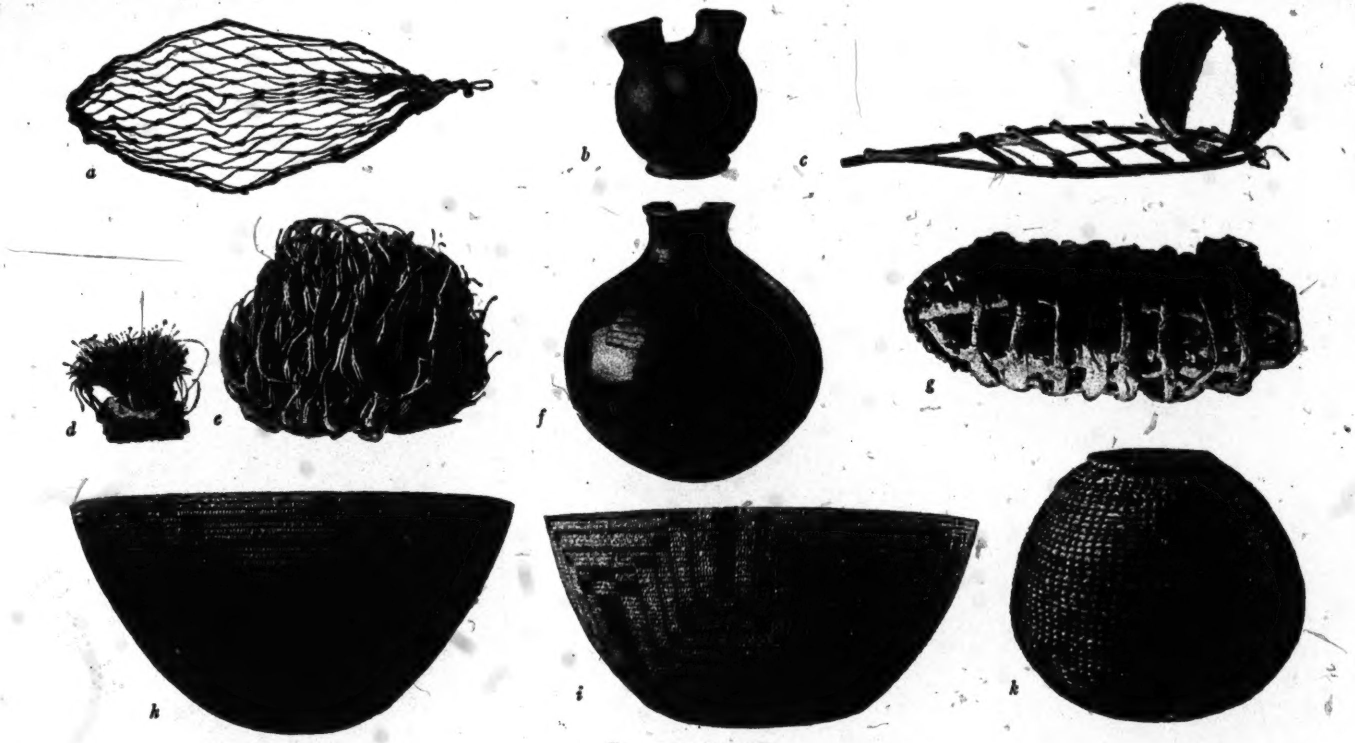
The rest of the day was spent in a house to house canvass and many baskets were bought. In the evening Pablo and I again walked over to see the dancing which had commenced anew at dusk. He soon joined the dancers and evidently the "old Adam" reasserted itself within him, for he danced with fervor the whole night.

As one sees everything better by taking part oneself in the proceedings, I, too, broke into the circle, grabbing those next to me by the hand. The orthodox way is to intertwine the fingers as one may see sailors do when they are ashore, or peasant girls of Norway when going to a dance in their finery. My white dress made me a conspicuous object in the dark night, and my dancing and singing evoked merriment among those sitting around. There was no difficulty in getting into the right tune, and my partners on either side, as well as the rest of those actively engaged, were too serious about their work to be distracted.

Just about the time that I entered into the performance, the medicine-men who were sitting with their legs crossed in front of the fire began to show activity. One of them suddenly bent forward and put his mouth near the sacred translucent stone that was lying before him; then he began to breathe forcibly and to blow over it, emitting at the same time a peculiar sound, which made it difficult for me to refrain from laughing. The stone, which had become warm through the long drought, was now being cooled and cleaned that it might attract rain. For fully ten minutes he remained thus at work; then both medicine men stood up and, holding eagle plumes in their hands, began to run around inside our circle, all the time thrusting the plumes upward toward the sky to draw rain-clouds. It is curious to reflect that Indians as intelligent as the Papago should so absolutely believe in the power of the medicine-men to make rain. In regard to man's relations to nature, the Indians have, since the discovery of America, learned nothing and forgotten nothing, and it will take many centuries to change their mode of thinking.

After an hour's dancing I went alone to my camp where my sleeping cot was awaiting me. It is a folding one and, when put up, stands high above the ground, which is convenient both in case of moisture of the ground and as a precaution against noxious creatures, such as scorpions, etc. The moon was shining, the night was warm, and I went to sleep under the open sky, as my custom is in this climate, rejoicing at the feeling of security one has while among Indians who have not been too much with whites. I must have been sleeping quite a while when I was awakened by the violent barking of my dog. On opening my eyes I beheld the disagreeable sight of a tall, half-nude Indian standing beside me in the moonlight. "*Compañero*," he said, ejaculating a few more words in unintelligible Spanish, at the same time thrusting forward a big open bottle with bright red contents, the smell of which at once made me aware of the situation. He was offering me sahuaro wine as a proof of his esteem. But he might have chosen a more reasonable hour for his hospitality, so I bluntly answered: "No; I will have nothing until I get up." He disappeared among the bushes as quietly as he had come; in fact, he did not give me time to ascertain what had become of him, and it seemed like an unpleasant dream. However, being desirous of getting some rest before the ceremonies that were sure to take place at sunrise, I fell asleep again after a while.

The wine did not mature as early as expected, and in the morning one of the principal men told the people to gather when the sun would be half-way between noon and sunset, when the culmination of the feast would take place. One of the Indians confided to me that the people thought I was all right; I danced with the proper step. Gradually crowds began to assemble, many of the young men on horseback; slender of figure but above medium height, they were of prepossessing appearance, sitting erect and following well the movements of the horse. Everybody was in his best attire, all adopted from the whites, and everybody, both men and women, looked clean. But there was no hurry about anything. After a few hours passed in this way, the Keeper of the Smoke, who was the general manager of all the proceedings, was seen to spread out blankets and mats on the dancing



PAPAGO ETHNOLOGY

a, Saddle-bag of coarse fibre; length, 1.57 metres. *b*, Canteen of pottery ware, used when working in the field; height, 17 ctm. *c*, Cradle, with detachable hood; length, 56 ctm. *d*, Bundle of martynia pods, split and ready for use; they furnish the black color in basketry. *e*, Bundle of martynia pods, stored for future use. *f*, Water jar; height, 34 ctm. *g*, Package of dried squash bands; length, 31 ctm. *h*, height, 29 ctm. *i*, sahuaro baskets, water-tight, used in harvesting sahuaro fruit and in wine-making. *k*, Granary basket for keeping maize, wheat, etc.; height, 60 ctm.

place, at each of the four corners of the world, to use the Indian expression. The principal men seated themselves on the mats toward north and south; the two medicine-men sat down on the eastern mat, and the Keeper of the Smoke on the western.

The multitude surged forward and took their seats, on the ground, I among them, all forming an imposing square that symbolized the four corners of the world, each of the four mats in that way remaining in the middle of a line of the square. Hardly had we seated ourselves before the vessels containing the wine were brought inside of the square from the lodge by four young men, each one carrying a vessel. This wine should have been carried in those large, beautiful, water-tight baskets of native workmanship, but, alas, there was only one of those, an indication of the declining days of the tribe. The remainder of the receptacles were replaced by three inappropriate looking buckets bought in the white man's store, more practical, to be sure, but infinitely more ugly than those superb baskets decorated with artistic designs. The young men went straight across the dancing place to the two medicine men in the east, who immediately set to work to bless the contents, driving out any evil spirit that the vessels might contain. This they accomplished by making slow strokes with the palms of the hands around the vessels from in front back toward themselves. They also sacrificed a little of the contents to the gods, dipping their hands into the liquor and throwing some of it about. It was done in a desultory fashion, showing, as one man explained to me, that they did not know their business well. The tribe, as I have already said, is daily losing its ancient beliefs and customs.

The distribution now began. The young men went in pairs, stopping before every one in his turn; each of the two would dip a gourd into the wine and hand it over. The recipient would, before drinking, lift it up toward the young man, saying: "*Návatsh!*" (friend!); if he were a relative, he would address him by the name of the relationship. It was evident from the beaming smile on the faces of those who drank that the wine awoke much satisfaction. My turn also came and I must confess that in this dry and hot climate, the beverage, when well made, and coming cool from the jars, does not taste at all bad, though I soon grew tired of it.

Four times in this manner had the young men made the rounds of the square, offering the wine quickly and with much precision, when two old men appeared on the scene. They advanced from the lodge, holding each other by the hand, fingers intertwined, and, beginning at the east, went in turn to each of the different mats where the principal men were sitting. The mat is called *váaki*, which connects us with the mythical long ago when the hunter put up a small round house of that name near water, in which he stayed during the heat of the day. At each corner of the world is a váaki or hunter's lodge. At each such "house" a long speech was made by one of the two old men, whose name was "Mocking Bird Talk." Addressing the most important man on the mat by his degree of relationship, or as a friend, as the case might be, he tells him to look for a white, shining house in the east, from where black clouds come. "The black clouds have many inclinations in different directions and we can, by our singing, turn them toward us and influence the winds to make this poor earth moist" he says. Then he asks for a song, and in response the group sitting on that mat sings about rain. After having in the same way solicited songs from the rest of the groups, seated at the cardinal points, and received immediate and enthusiastic answers by invariably well-executed songs, the old men return to the lodge.

They immediately, however, come back for a similar round of visits, the speaker this time asking for an expression of friendship for himself. Every one answers "friend!" or gives him his degree of relationship. Next, the groups on the four mats sing in turn and, after that, wine is again offered around four times.

The pair of old men reappear and the speaker again admonishes those on the mats to look for the shining house in the east, where the black clouds are. A wonderful cloud reaches up to heaven and in it lives the mocking-bird. He comes out, jumps around, puts his head back and talks. "Through your strength," he says, addressing the mocking-bird as if present, "come all the clouds that are, all the winds that are, all the lightning, all the thunder. From all the mountains spring up other clouds joining the rest. It matters not how wide the earth is, the clouds touch all the sides. It matters not how many sierras there are, the clouds cover them all. It matters not how many arroyos there are side by side, the clouds cut across them; nor does it matter how many small arroyos there are, the clouds cover them all. When the rain comes down, the flood carries along the sand and the loose trunks and the sticks and fallen branches, piling it all up. The clouds and the winds get up and stop in the west, whence the rain spreads over this poor earth. When shall we see this again?" The speech was briefly answered at each mat, and from either side the friendship which they all felt for each other was emphasized. The singing was quite enjoyable and there was a pleasing atmosphere of antiquity about the proceedings. Finally, the chief arose to make a speech in which he warned every one to behave properly while partaking of the wine which had been brewed in the houses.

The official part of the festival now being over, people repaired to the houses, where the sahuaro wine flowed through the evening and night. Friends from the neighboring country added to the merriment. Both men and women become intoxicated on such occasions, and, formerly, quarrels of long standing were settled at the feast according to the laws of the vendetta. Murder used to be of frequent occurrence, but, to prevent the possibility of quarrels ending in a fatal way, the chiefs of our time are wise enough to gather up beforehand all the knives, pistols, and rifles, returning them to the owners after the conclusion of the festival.

It should be noted that in March, about the time of the equinox, a ceremony, accompanied by singing, is performed to insure a good sahuaro harvest. Seeds of the fruit are ground and put in a basket into which also four sticks, taken from the dried plant, are placed, one at each cardinal point. Sitting around the basket, people spend a night singing, while the medicine-man makes prognostications for the coming harvest. The seeds are eaten by those present, and the four sticks are given to four persons who later, when the season comes around, leave them at the foot of a sahuaro.

As soon as the Indians were rested enough after the celebrations that ended the festival, I had an interview with Chief Alvina, whom I found to be conscientious about the information he imparted, and in a charmingly sincere way not afraid of telling anything. His father, who had died two years before, had been chief before him. The Papagoes declined to tell anything about their beliefs and ancient customs, he said, but he could see no harm in letting strangers know about them. Unfortunately for me, his knowledge of those matters was not commensurate with his liberality. Furthermore, he always told his people that there was no harm in being photographed. Their fear he could not comprehend. He had himself been photographed many times, and he never inquired as to what they were going to do with his photograph.

It was a very exceptional stand he had taken; as a rule, the Papagoes have the greatest objection to the camera. They are not afraid of it, but are intensely annoyed at the photographer's efforts, because, in their opinion, part of themselves will be taken away and will always remain behind after death, causing much disturbance to the departed, who in that way will be, so

him then, but during the following three days he worked at the drawing from memory in his spare time, being mostly occupied in his field and with his cattle. After long deliberation, he finally consented to part with the picture which is shown on plate. The horse is painted with red ochre and the necktie is blue, the color having been bought in an American store. The artist was about fifty years old.

Following a fairly good wagon road eastward through the Comobabi Mountains, I first halted at a rancheria called "Badger's Well," where I found all the old people absent in the sahuaro fields. The younger generation, inclined toward the white man's ways, offered little of interest. They spent much of their time in laughter and animated talk at the well, where they watered their cattle and horses. I noticed a quail creeping stealthily to drink from the overflow of the water, a few yards from the well. Its thirst was quickly satisfied, when it retired to safety among the bushes.

A man sold me a spur made from the cleft of a mezquite bush. It has a very sharp point, which is most efficient, though cruel. Only one foot is thus provided. A negro came along, a rather strange appearance in this part of the country; he told of a silver mine four miles east of there that he and half a dozen of his race owned. It had been found by one of them who had been a prospector for eight years.

There were many ants in my camp, so I was glad to pack up in the morning. A visit was first made to the burial place, which was of the usual unattractive description, in this case almost hidden under huge piles of palo verde branches. A tiny enclosure of upright ocotillo stems was pointed out to me as the modern cemetery, due to the teaching of the missionary. Bundles of clothing to be used by the deceased had been placed among the branches of trees near both cemeteries.

CHAPTER V

COMOBABI—AN ATTRACTIVE INDIAN FAMILY—MARIANITA—A HORNED LIZARD THAT SPURTS BLOOD THROUGH THE EYE—AN ABORIGINAL WAY OF RECORDING EVENTS—THE PAPAGO CALENDAR—HARVESTING SAHUARO—HOW TO KEEP COMFORTABLE IN GREAT HEAT—A VISIT TO CHIEF ALVINA

Our next halting place was made at the rancheria of Comobabi, comprising a somewhat extensive area on a beautiful slope at the foot of the mountains. Most of the houses here, too, were temporarily abandoned on account of the sahuaro harvest. Early in the afternoon we drove up to a house which impressed us as being the most hospitable looking; the family were just seating themselves on the ground outside, to eat tortillas and beans, the husband standing near by with his horse saddled. They received us as if we had always known them, although Pablo had not met them before. We were invited to share their food, and, as soon as they were made to understand that I wanted to buy all sorts of Indian things, they cheerfully produced whatever they had. I purchased two bags full of certain eatable seeds, which I had much desired to procure, also a meal basket made by the thirteen-year-old daughter, who had the sweet-sounding name of Marianita, although neither Spanish nor English was among the family accomplishments.

The lady of the house had in active use two of those peculiar burden baskets called *kibo*, in which the women carry on their backs loads of wood, gourds, or pottery, as the case may be. It consists of an attractive looking net-work of mescal fibre, which has been produced from the leaves after they have been first boiled. The net is attached to a hoop which is fastened between four long poles of sahuaro ribs and is supported by a woven band of strips of zotol leaves that passes over the forehead. This contrivance is getting to be rare in the Papago country, with the introduction of mules and horses, and the woman who owns one is with difficulty induced to sell it. She spends considerable time in its manufacture, and in an old-fashioned family like the present it is of very great usefulness in every-day life. The black twine was from her children's hair, which she cut once a year until they were about twelve years old. I expressed an ardent desire to buy one that was standing outside of the house against the wall, and, after having thought the matter over for a couple of hours, she decided to sell the most used one for five dollars, though she hated to do so; for an additional fifty cents she would mend the net-work and put in a new plaited band for the back and the head. The offer was promptly accepted.

Pablo and I made a tour of the houses of the rancheria, some of them being three-quarters of a mile away. In two of them we found only old deaf women at home, the rest of the families being at the harvest of the savory cactus fruit. On our return, toward sunset, our Indian friend and little Marianita were busily engaged in washing a large sleeping mat, plaited from zotol leaves in the usual manner, which I had also bought. Another, a smaller daughter, sat near by, while on the roof the third child, a boy of eight summers, was romping in a short shirt, throwing stones and looking picturesque against the blue sky and the mountains of Baboquivari. One's photographic propensities are sorely tried under such tempting circumstances. As we approached, the boy descended. Pablo, at my bidding, engaged the family in conversation and I tried to avoid observation while taking snapshots, for, if seen, that would have put a speedy end to the friendship so happily begun.

This was an attractive family that carried one's thoughts back to the Indian of long ago. The mother seemed the incarnation of sterling qualities, well meaning, intelligent, and active. She had quite an eye to business, but she asked fair prices. She looked about fifty, the picture of health, and had borne thirteen children, nine of whom were alive; many of these were full-grown and the youngest was six years old. Her husband, who was as friendly as his wife, or even more so, had a peculiar name, Piukváotam, "He cannot be eaten" (because bitter to the taste). This probably expresses some characteristic of antipathy which I failed to discover, the Indians being extremely critical in their application of names.

It was the 10th of July; for several days the maximum temperature had remained at about 100° F. A moist wind, somewhat cooler, had been blowing too gently for real comfort, but that day about sunset the air currents changed and became dry. In the evening the temperature felt just right, about 85° F., and the air, at an elevation of four thousand feet, had the superb quality of the desert.

I had selected my camp a couple of hundred yards from the house, on a sandy, level ground among small mezquite trees and choyas. The sandy surface was as clean as if man had never walked over it; the Indians on their way to and from the distant well at the foot of the mountains all followed the same track, and there were no waste paper and tin cans strewn about to impair the full enjoyment of nature, as would have been the case near civilized man's abodes.

The attractive camp, the nice family we had met, the addition to my collections, the peace and quiet of the place made me feel happy as I stretched myself on my cot under the starlit sky, which seemed so blue and cool and near. A soft breeze from the west fanned me to sleep, while a mocking-bird kept on singing its most delightful notes in the dark night. Ye dwellers in cities know not what it is to feel your freedom!

Next morning, shortly after sunrise, I strolled over to the house to see what my Indian friends were doing. The mother was busy at work repairing the burden basket she had sold me. She was just finishing a new band for the back, which is plaited in the same manner as the sleeping mat and from the same material. Some Indians rode up offering for sale a most interesting wooden object that resembled a broadsword, and which may be termed a hoe, made of the heavy iron-wood and accordingly very strong. This implement, which is called *kiik*, the same word as that for plough, had, according to my informants, been found in a mound in Santa Rosa valley. It is extremely rare, though I later succeeded in securing, mainly in the rancherias of Santa Rosa and Ánekam, ten specimens more which were kept in the houses of the Indians. It is not quite appropriate to call this implement a hoe, as it was employed solely for the purpose of weeding. Although I did not see it in active use, people in that section of the country know it very well. Probably it is occasionally still resorted to. The showers, which in that hot climate make plants grow very fast, bring forth in luxuriance weeds that, unless twice removed, would choke the crops. For the more recent innovation of wheat agriculture during the winter, one weeding is sufficient.

When in use the wooden hoe is held by both hands in a more or less horizontal position, the left hand around the handle, the right on the blade, while the bearer crawls on his knees and cuts in between the weeds, loosening the roots and turning them up. I found a simpler form of the same implement, smaller in size and consisting of a flat, oblong piece of wood with edge sharpened in a similar way, which was said to have been for the use of women.

On returning with milk which he had bought from the friendly family, Pablo told me that Marianita, the young girl, had gone to the well for water, a mile away, and that I might have a chance to take a snapshot of her when she returned. After a while she appeared at a distance with a big tin bucket on her head, but how much more beautiful my small Rebecca would have looked carrying an earthen-ware jar of native workmanship. There are lots of pottery vessels still manufactured by the Papagoes, but the white man's implements are recognized to be more practical. I suppose the change is unavoidable, but the bucket was distinctly disappointing to my photographic sense. Before she approached my vantage point, an Indian met her who evidently asked for a drink, for he lifted the heavy bucket down, drank, and put it on her head again. When I gave her some candy after the short and unexpected ordeal, she looked frightened. She stepped along quickly, showing somewhat that she felt the weight that she had been carrying for fifteen minutes. This was six o'clock in the morning and, on rising, she had first helped her mother milk the cows.

Half an hour afterward she again passed my camp; this time she was bound for the sahuaro fields along the base of the mountains. The girl of thirteen years walked fast, carrying over one shoulder the long stick with which the fruit is brought down. Two hours later she returned with a small bucket full of the juicy fruit, on which a newly arrived guest and the rest of the family gorged themselves, while she sat near by resting. She did not look tired, however, and I saw her later helping her mother make wheat biscuits, baking them in an oven adopted from the Mexicans.

It was a great pleasure to be with these natural people. I sang to them my newly acquired Papago song, "The

Frog Doctor," one that is used at the sahuaro festival, and ingratiated myself in their favor. The mother, always busy in doing something about the house, was engagingly free and easy in her manner. I ventured to ask if I might not photograph her; she looked disturbed, but after a while consented if I would promise not to show her picture in Tucson. She had the burden basket on her head, appropriately enough for a woman of energy and activity, but her whole being had suddenly changed, and it was impossible to make her walk and look natural. Her face was flushed, she looked embarrassed, and made a poor picture.

In spite of presents to the children, they all steadfastly declined to be photographed. However, sitting down to catalogue my lately acquired ethnological objects in the shade of a jacal, I found opportunities for snapshots while pretending to write. When Pablo took the horses and my dog to the well, I hugely enjoyed a rub down from my wash basin, as well as a change of clothing, and soon we were off again on the road.

At this rancheria I had a curious experience in the morning with a horned lizard (*phrynosoma*), rather dark in color, which my terrier pursued for eight or ten yards, when it flattened itself out and refused to run any more. The dog was watching for it to move and I stepped up. When put on its back it would immediately turn over; stooping down, I tried in vain to tease it to run again, but it remained immobile. I was just about to rise and leave when, to my great surprise, a spray of what appeared to be blood was dashed on my right hand, which was from eight to ten inches, not less than eight, distant from the animal. I did not notice whence the fluid came, but I observed that its left eye was bloody; in other ways it seemed normal, and had evidently not been maltreated by the dog, which feared its spines. On my return to civilization I find that the singular habit of ejecting blood from the eyes, peculiar to this animal, is known to the ranchmen of the region of its habitat, both Mexican and American, and that it also has been brought to the attention of men of science. It has been suggested that the habit is practised only during the time of the shedding of the skin.

The night spent at the next rancheria in the Baboquivari Range was disturbed by the constant, melancholy, low howling of a dog mourning the absence of the family. He was a very old dog, a black and white cur, with an honest-looking face. Usually Indian dogs have little reason for loving their masters, who show them small consideration. After having visited a new Indian settlement called San Pedro, in the Roskruge Range, where there is excellent water in a well twenty-six feet deep, we continued our trip for six miles northward along the western foot-hills. There are extensive sahuaro forests in this undulating country, which were unusually picturesque in the afternoon sun. We came across one or two camps of Indians who were gathering the much-relished fruit.

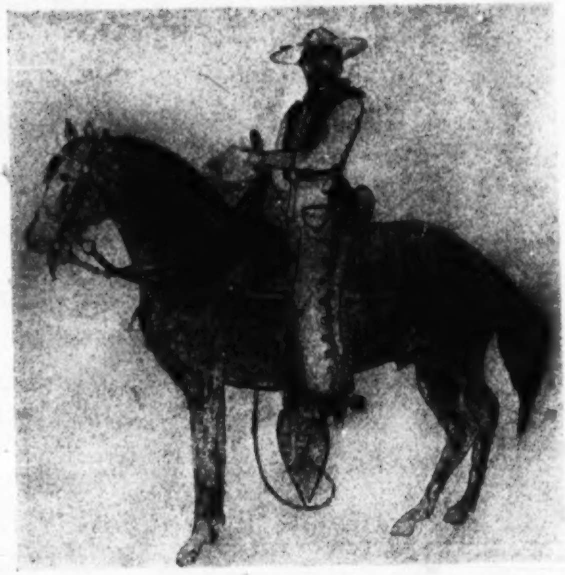
At dusk we met two young men on horseback returning from a shooting expedition, who presented us with half a deer tenderloin and some ribs. My aim was to

PALO VERDE, NEAR A PAPAGO CEMETERY
Among its branches bundles of clothing for the departed

THE MEDICINE-LODGE AT SANTA ROSA

to speak, only three-quarters complete in the other life. Usually the people ran away from my kodak, and it was extremely difficult to photograph them unawares, as they are very keen and in a way scent the impending danger. A young, good-looking man, of whom I asked permission to take a quick photograph, surprised me by answering in the affirmative. He entered his house to get ready for the fray, saying to his wife, "I am going to have my picture taken. I am a man and I am not afraid of seeing myself after death."

I kept the honest chief till late in the afternoon, when he was obliged to go to his sahuaro camp, near the south end of the Quijotoa Range. He offered to return the following day, but I thought it better to look him up later on. There was present at the interview a man who had acted as a singing shaman at the feast, Juanito by name. He owned a few head of cattle and some horses, and had been much with whites, hauling wood or doing similar work, but in spite of this he spoke no English and only a few Spanish words. It was he who in the excitement of the feast had waked me up in the middle of the night. Some twelve years ago Juanito had seen a Mexican make a drawing, and last year it had occurred to him to try his hand at this accomplishment, which had made a strong impression on him. Considering that this was his first and only effort with the pencil, the product was by no means discreditable. His brother posed for him on horseback for half an hour, in order that Juanito might get a clear conception of the subject he was going to draw. Strange to say, he did not draw



Picture drawn by an untutored Papago

Using the ancient hoe

Mother with child in cradle. Aktjin

In 1849: Unusual snowfall, killing men and beasts.

In 1850: Successful attacks by the Apaches on the Maricopa at Red Rock, as well as on the Papago near Magdalena, Sonora.

In 1851: Severe disease, called "black vomit," appeared. Its symptoms were painful fits and cramps. Dark-colored blood would flow from the mouth. When the sufferer vomited, it was a sign of relief. Many Indians died, including some medicine-men. (This may have been yellow fever.)

In 1852 and 1853: Papagoes repelled attacks by the Apaches in Arizona.

In 1854: Papagoes fought with the Apaches at Santa Ana, Sonora.

In 1855 and 1856: Death of relatives.

In 1857: American soldiers were killed by Mexicans at Caborca. (This alludes to the defeat of the filibusters under Captain Crabbe.)

In 1858: Birth of a girl relative. She afterward became makai (medicine-man.)

In 1859: The Papagoes in the winter went to dance with the Pimas, below Sacaton, in order to secure wheat. (It was also the custom for the Pima to help at the feasts of the Papago, the reward being in either case grain or domestic animals.)

In 1860: Prominent chief died.

In 1861: Papagoes in Mexico engaged the Apaches and were victorious. The booty, consisting of shields, bows, and arrows, was sold to the Mexicans for mescal brandy and maize.

In 1862: A fight with the Apaches in Mexico.

In 1863: His first marriage took place.

In 1864: His first child was born.

In 1865: Apaches captured one Papago, who later escaped.

In 1871: Apaches made peace with the whites at Arivaipa.

In 1874: Apaches attacked San Xavier.

In 1875: Ball games with foot-racing at Caborca, Sonora. He won in betting, one horse, saddle, and bridle.

In 1876: Disease, accompanied by the loss of hair. Many died. (Perhaps this was typhoid fever.)

In 1880: The railroad arrived at Tucson.

In 1881: A relative became crazy, killed his wife with a knife, and then himself.

In 1882: First *fiesta* in Mexican fashion took place at a rancheria which formerly existed where at present the Indian Oasis is. (This means that the Indians of Arizona began to adopt the social gathering in use among the Mexicans, without imparting any religious importance to the festival. A fiesta among Mexicans always includes dancing, which, in our time, has been adopted by the Papagoes of Sonora, but generally not in Arizona. On the occasion related, the people danced one by one in a circle.)

In 1885: A visit to a Pima feast. Many singers went, and many others, all well dressed.

In 1887: An earthquake in the "flowers disappear" moon.

In 1889: The Pima took part in a dance in order to secure cattle. This was in the "dry grass" moon.

In 1890: A feast at San Xavier in the "dry grass moon."

In 1891: San Xavier Indians came to dance at Kvítatk (near the "Pump-house" near Horseshoe).

In 1893: A foot-race at Kvitatk in "inner bone" moon (winter). The racers starting in the middle of the day, ran as far as Santa Rosa, returning at dark (about 8 P.M.).

In 1897: Foot-races at Åktjin.

In 1898: Two nephews put in prison in Yuma for smuggling mescal brandy.

In 1899: Two relatives imprisoned in Tucson for stealing cattle.

In 1901: He was isolated at Tucson on account of small-pox in the family.

In 1902: A foot-race at Tjeavólitak.

In 1903: A foot-race at Kvítatk.

In 1904: The purification of girls in the winter.

In 1907: His friends put in jail for fighting at a sahuaro feast at Kvítatk.

In 1908: Many Papagoes that were attending the fiesta of San Francisco in Magdalena, Sonora, were imprisoned for resisting the Mexican authorities when being pressed into military service to fight the Yaqui. A chief from San Xavier went down to Magdalena and helped them to get out.

During recent years he has been blind, but a friend and his wife have assisted him in placing marks according to his directions. The event of this ensuing year would be the visit of "Carlos" to his sahuaro camp, he said. I append here the Papago calendar which divides the year into thirteen "moons," or *marsat* in the native language.

THE PAPAGO CALENDAR

1. Tonjapik Marsat, Hot Moon (*tonj*, hot).
2. Tjokiapik Marsat, Rainy Moon.
3. Shópol Usapik Marsat, Short Planting Moon.
4. Vársa Kakitak Marsat, Dry Grass Moon (*kákitak*, dry).
5. Vihamik Marsat, Touches Mildly Moon. (The cold touches mildly.)
6. Jómali Súipitik Marsat, Low Cold Moon (*jómali*, low).
7. Úta Váokat Marsat, Inner Bone Moon. (The middle of the winter.) It is also called Ku Súipitik, Big Cold.
8. Óvalik Marsat, In Heat Moon. (When the animals are in heat.)
9. Kíhotak Marsat (untranslatable). Meaning: When the animals have lost their fat.
10. Kómaki Marsat, Gray Moon (*kómak*, gray). (When the trees are without leaves.)
11. Tjuutáki Marsat, Green Moon (*stjuutak*, light blue or light green).
12. Oám Marsat, Yellow Moon (usually *suváni*, yellow). (Yellow flowers on trees, bushes, and plants, such as the palo verde, the greasewood, century plants and cacti.)
13. Hikokiapik Marsat, Flowers Disappear Moon. (Plants begin to make fruit.)

The old man was amply rewarded for his interview and consented to be photographed, though his wife, with the usual Papago ignorance of money value, prevented me from finishing the operation by telling him to ask eight additional dollars for his consent.

Their camp consisted simply of a roof of branches resting on four poles, sufficient to provide some shade during the day. Early in the morning all the female members of the household could be seen proceeding on their fruit-gathering expedition, each armed with a large basket and the usual pole, about twenty feet long and made from two pieces of sahuaro rib. At the top of the pole, as well as lower down, there is a kind of hook made by tying crosswise in these two places a small piece of greasewood by the aid of which the spiny fruit is broken off. Two or three hours later they returned, each carrying on her head her share of a heavy harvest. The skin with its spines had been removed in the field, so the inside of the huge water-tight basket presented an appetizing mass of crimson fruit pulp, as well as a great amount of similarly colored juice, which would keep for a few hours only. Most of the contents of the baskets was immediately emptied into large jars, to be boiled for about two hours, when the mass is strained in order to separate the numerous small black seeds. The juice is boiled for hours longer until it becomes sirup (*sítoli*), which is kept for future use in small earthen-ware jars, each neatly sealed with a piece of broken pottery and sticky mud. Being pleasant to the taste and much superior to molasses, I found this sirup excellent as part of my provisions. I also relished the fresh juice of the fruit when brought in cool in the morning.

I had taken my notes in a temperature of 107° F. in the shade of the jacal; at dawn that day the temperature had been 74° F. and I actually awoke from feeling cold. During the previous five days the maximum temperature had been above 100° F., and the heat still continued as high for three days more. No clouds had appeared for several evenings and the rains were delayed. It certainly felt warm as we travelled along on our return journey to San Pedro. No shade, as that word is understood in other climes, is found anywhere; the palo verde is seldom very serviceable for this purpose, and the best tree for shade is the mezquite, but on such days as these the fierce rays of the sun easily penetrate its somewhat scanty foliage, even the ground underneath the tree becoming heated. It was difficult to make the air circulate under our wagon cover, and we found ourselves in a heat as great as that of a Turkish bath. Still it is good policy to make the most of every favoring circumstance, so we always stopped for lunch near some mezquite tree, built a fire by which we made coffee, and had some canned goods and puffed wheat with evaporated milk to eat. The coffee especially, when made well, was very acceptable. After that we continued our journey greatly refreshed and actually cooler. My dog, however, did not know what to do with himself, refusing steadfastly to eat during the day; his favorite place was in the wagon, under the seat, on top of a box.

On July 15 the oppressive heat was lessened toward evening by a violent storm from the south-east, which darkened the atmosphere first with dust, then an hour later with welcome black clouds which poured down considerable rain. The storm passed from Indian Oasis over Tucson, where, as I later learned, it damaged the roof of the new hotel. Some more rain the following evening and night made the outlook bright for continued travel. We were soon on the road again westward bound for Chief Alvina's sahuaro camp. After the somewhat vague indication as to its location being near the southern part of the Quijotoa Range, we had been left to our own instincts of orientation to find it.

On arriving at the so-called "Pump-house," near the Quijotoa Range, I made a dêtour of thirteen miles southward to the great summer rancheria Kuőitak (Big Field), in order to make sure that the recent showers had not already induced the chief to leave his sahuaro harvest for agricultural pursuits. It was surprising to find such a large cultivated area in the wilderness. It was over two miles long, from east to west, and a half mile wide, consisting, of course, of many small adjoining farms, all fenced in by loosely made mezquite fences. The late showers had certainly been effectual in bringing about changes. Pools of water enlivened the landscape here and there, and even some grass had begun to appear, scarcely forty-eight hours after the rain. Birds were singing in a lively manner, and there was spring in the air, but evidently the Indians did not consider the rain of sufficient quantity to justify them in beginning their ploughing. In July or August, as soon as they are assured of the soil being well soaked, they immediately repair to their summer rancherias. So far, only one family had arrived, so we continued our journey toward the southern end of the Quijotoa Range.

In the evening mosquitoes and other insects gathered around the lantern and small brown beetles crawled inside of my trousers or through my hair, reminding me of tropical climates. Next morning, before starting, I had a refreshing bath in a small water-hole, while a butcher-bird (*lanius*) in a near-by bush sang with all his might, apparently enjoying the changed conditions as much as myself. This bird was often seen in the desert, often far from water. Although the thermometer registered as high as 92° F. in the warmest part of the day, still the atmosphere, refreshed by the storms, felt remarkably cool, and the weather was cloudy.

The southern part of the somewhat extensive Quijotoa Range, separated from the rest, is called by the Papago, Kihotóak (*kíbo*, burden basket; *tóak*, mountain), said to be derived from its shape. The Spanish name of the whole range is a corruption of this native name. I was glad to find Chief Alvina in his camp, which was in close proximity to great forests of sahuaro on the slopes along the eastern base of the mountains. He brought me as a welcome some pitahaya fruit which tasted remarkably well. All the rest of the fruit gatherers had already left, for the sahuaro season was over, though there were still to be found pitahayas, the other savory cactus fruit of the region. There was no pasture; our horses fed on rolled oats, besides relishing the leaves of the palo fierro (iron-wood) tree.

The chief was perfectly willing to be interviewed for hours. He thought the number of the Papagoes was decreasing. Few old men were seen any more. The food which is gradually supplanting their native dishes is injurious to the health of the Papago. Children were no longer obedient. The young men nowadays are seized with restlessness and want to leave for other parts of the country; nobody takes care of them, and they die early, he complained. We took a walk together, and he pointed out to me the ripe nuts of the *jójoba*, a bush of common occurrence in that country. They are eaten by the Indians and have rather a pleasant flavor. As they contain a great deal of oil, they might compete with peanuts in the oil industry of the world, were it not for the slow growth of the bush. Mr. M. G. Levy, mine-owner and store-keeper in Ajo, thinks that they will prove of importance as cattle food and that they should be cultivated. Among the frontier population the oil has great reputation as a hair restorer.

On two afternoons we had quite heavy showers, and I felt some regret at having disposed of my large, though inconvenient tent at Indian Oasis, taking with me only the fly. Pablo and I were drenched and so were our blankets. It would have been difficult to make a fire but for the presence of the small resinous bush called *tovoso*, which burned lustily in spite of being dripping wet. We tore the bushes up entire and kept up a bonfire by which we dried ourselves and cooked our food. I began to wonder whether this could truthfully be called a desert.

CHAPTER VI

HORSESHOE IN THE QUIJOTOA RANGE—INDIANS AS MINERS—SPENDING A NIGHT UNDER DIFFICULTIES—DELIGHTFUL NATIVES—A WOMAN'S GAME—SANTA ROSA RANCHERIA—THE GREAT HARVEST FEAST OF SANTA ROSA

After an affectionate leave-taking from good Chief Alvina, we departed northward for Horseshoe, eating, as we travelled along, delicious pitahayas with which we had provided ourselves. Eight miles before arriving at our destination we passed on the llano the pump-house that had once been placed over a deep well, which, according to trustworthy information, is five hundred and twenty feet deep. It has an abundance of water from an undercurrent and was once the pulse of a short-lived, though intense, mining activity. If the information that reached me is correct, the discovery of a bonanza silver mine of very rich ore started a boom here nearly twenty years ago. Several thousand people gathered, the usual fabulous prices were paid for corner lots, and telegraph and telephone lines were established with Tucson. To-day the silence of death reigns here; the roads have been obliterated, the houses have disappeared, as also have the telegraph poles, and there is no sign of any former activity. I should have felt inclined to consider the whole thing a fable but for the unattractive remains of the pump-house, which the Indians have annexed, building a few houses near it and naming their rancheria from the tall chimney. Five miles north is a rancheria called Sikulhímat ("where the water goes around." *Sikul*, round). Here, according to the Indians, the drainage of rain water flows toward the Gila River; south of that place it flows toward Mexico.

Horseshoe is the name of a once noted placer mine, the surface of which has been worked out. There are gold mines of a similar nature around the southern end of the Quijotoa Range. Judge Day has a store at Horseshoe and buys gold from the Indians, who still, during the winter, keep up the "dry-washing" process here, using for the purpose the machines that are common to the neighboring district of Altar, in Sonora. The Indians are even able to make the machines themselves. Judge Day is a man of intelligence and much common-sense, and, having lived here since 1893, was able to give reliable information about matters pertaining to the region. According to him the padres from San Xavier Mission, two hundred years ago, found the placer mines of Quijotoa. He showed me some nice nuggets of small sizes which he had lately bought. Five years ago the Indians found free gold in a piece of quartz which was worth one thousand six hundred dollars. After that eighty Papago and a few Yaqui Indians worked here for half a year, taking out in value between ten thousand and twelve thousand dollars, Judge Day buying most of the gold. The relations between the miners—all Indians—were cordial. When any of them had found a rich spot, he would tell it to the others, and next morning the crowd would begin to work as near him as possible. No ill feeling or fights ensued; they would each earn from four to five dollars a day. The miners when coming home would always wash after changing their clothes. Considering the trouble of getting water at the only well, their cleanliness may be considered an example even to whites. The women are particularly cleanly, and wash their own clothes frequently as well as those of their husbands.

Judge Day and his family, who have been living here among the Indians for so long a time, gave very good reports of their neighbors. He had spent twenty-two years among Indians, and considered the Papago the safest. "As a rule, they are honest," he said, "though there are scalawags among them, but these are discredited by their own race. The women will steal trifles, picking up a rope or the like, but the men will seldom do that. The store often gives an Indian twenty dollars on credit, and he will apologize if he does not pay in ninety days. These Indians, like the Mexicans, are pleased to be in debt, because they consider it an honor to be trusted. If the average native *says* he will pay his debt, he will do so."

Like all Indians, the Papagoes are kind to their children, the father no less than the mother. An Indian couple were purchasing some articles in the store while I was present; their strong and fat infant was crying continuously in its mother's arms, she trying vainly to stop its wails. Finally, I saw her, with a few words, hand the babe to her husband, a boyish, good-looking man and apparently younger than herself. He took the howling nuisance gently and walked resolutely off into the hot sun. I wondered what was going to happen. He went straight to the well, gave the fretful youngster a bath, and returned in a few minutes with his purpose accomplished.

It may be of interest to note the manner in which the daughter of the American family at Horseshoe, who when twelve or thirteen years old was in poor health, grew to be strong and well. Being brought up with the Indians, whose language she speaks, she taught herself the accomplishment of every Indian girl, to carry a water-jar on her head. This made her healthy, and now she weighs one hundred and fifty pounds.

To the north of here, only about six miles, travelling by the track, is an important rancheria, Tjíuvak ("Where Something Decayed"), lying among low hills in the Quijotoa Range, where a road passes from east to west. I was desirous of seeing the best-known basket-maker who lives here, but she, like the rest, had just left for the summer ranch. The place looked much like a village, but was temporarily abandoned on account of the season, so we continued our journey northward by an excellent road that had been furnished mainly by nature. It was a slightly downhill drive, the country now almost imperceptibly sloping toward the Gila River.

We arrived late at a summer rancheria with the somewhat disconcerting native name, "Dead Old Man's Well." Here we expected to find the people of the win-

reach the camp of the man who possessed the calendar record of which the Indians had told me. It grew pitch dark before our day's journey was over, a large blazing fire, which enlightened us as to the position of the camp, guiding us from some distance. Our arrival naturally caused surprise, but was easily explained, and the man promised to show his calendar stick the next morning.

This calendar, which, as far as I know, is the only one existing in the tribe, is an attempt at keeping a record of events by various marks on a wooden stick. Made from pine board, it is seventy-nine inches in length and one and one-quarter inches broad at the middle, narrowing toward the ends, and about an inch thick at the centre, which is the thickest.

The old man, when fifteen years of age, had taken it into his head to begin a record of the events of his life, giving to each year a space of about an inch on the stick, separating one year from another by a transverse notch. He thus made one notch for each year that passed, and their number had now reached sixty-seven. The events of the year are depicted by crosses, dots, lines in various positions, as zigzags, angles, parallels, etc., and, as they have significance and meaning only to him, are less interesting from the point of view of the markings than from the events recorded. More than one kind of mark is rarely applied for each year. As the record of happenings that appeared to him important, accompanied by his own explanations, may be of interest, I shall give here the principal ones:

rested, though at an inconceivably late hour for that country, for the sun had been nearly half an hour above the horizon. The men had gone to plough the fields, but lots of women and girls and a few young men had gathered waiting for me to get up. They had brought many objects, which they understood I wanted to buy. As soon as I opened my eyes two kinds of the medicine-man's rasping outfits, women's games, a splendid bull-roarer (see page 95), and other tempting things were presented for my approval.

The attitude of the natives was an unlooked-for delight. With the exception of the men who were unavoidably absent, the remainder of the four or five families that made up the rancheria seated themselves around me, showing much interest in my presence and eager to sell what they had brought. I distributed candy to every one, and much enthusiasm was evinced, the utmost good-will prevailing. Two elderly sisters, talkative and impulsive, were very intelligent in giving explanations of the articles offered for sale. One of them sat down on the ground and showed me how the medicine-man's rasping-sticks were used, at the same time rendering the appropriate song. The other one, seizing a pair of wooden tweezers, which are used in pulling off certain edible cactus fruit, proceeded in a most graphic manner to demonstrate how the spines are rubbed off by the same implement, whereupon the fruit is placed in a basket and taken home to be cooked. Her quiet pantomime, full of humor, made matters clear beyond doubt unto the smallest detail, without her uttering a single word. She would

Showing how to swing the bull-roarer

Woman's game of double-ball

Papago woman, with her children,
from Bisani, near Caborca

have done credit to any stage. It was a busy morning, and when the crowd saw us getting ready to eat our belated breakfast, they considerately said, "Let us retire that they may eat." Pablo and I seated ourselves near the fire, and it was a small matter that the rice had been burned during the activities of the morning.

After a while, we had them all back again. The implements used in a woman's game were offered for sale. They comprised a small object, consisting of two short, thick sticks from the cat-claw tree, linked together in the middle by a twisted leather string. This *óla*, as they call it, has to be thrown with a thin pole, slightly curved at the point, and the movement must be made by applying the point between the two connecting sticks and then casting it upward. The game consists in throwing the object so as to reach a certain goal, the opposing party trying to prevent it. At my request, the woman with the imitative gift induced four young girls to show me how the game was played, and they immediately prepared for the fray. The colored bandannas were disengaged from around the head and tied around the hips. The uncovering disclosed beautiful black hair, well-groomed *à la mèxicaine*, parted in the middle, and hanging in two generous braids down the back. The next minute they all spat in their hands and smoothed their hair, then the game started. The girls played two against two. The óla was first thrown up in the air, the players standing ready opposite each other. The tactics of the opponents was to run with their backs turned against the others and strike the disputed object with their poles. Each game was played with much agility and lasted only a few minutes, the participants keenly enjoying the sport. Formerly as many as twenty women on each side took part in this game.

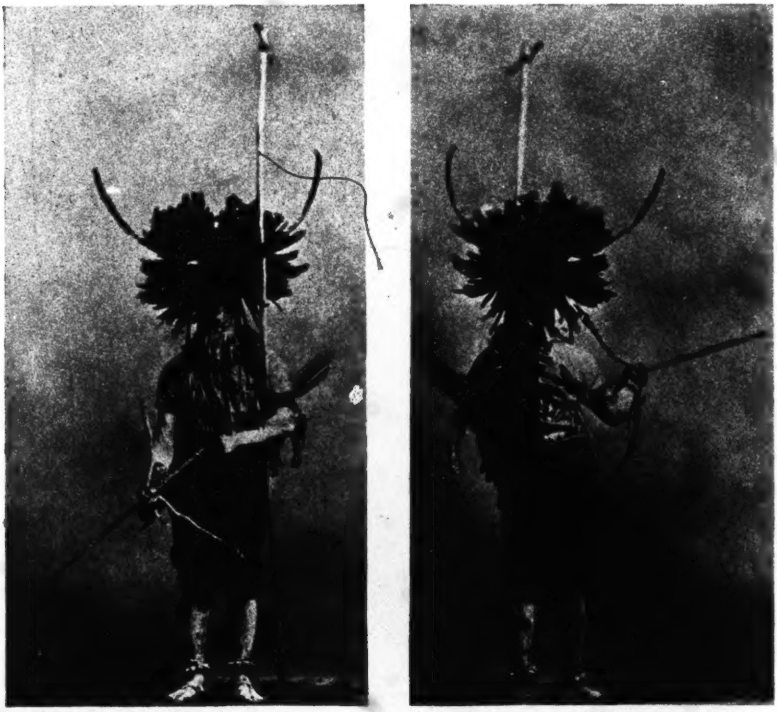
I ventured to take snapshots and, strange to relate, it was not resented. A boy showed me how to swing a bull-roarer, and we all had a good time. Though the wearing apparel of these people and most of their utensils came from the white man's store, still, neither English nor Spanish was spoken, only Papago. They behaved something like natives who have not been much in contact with whites, and these "poor heathen" were the nicest Papagoes I met on my whole expedition. The entertaining crowd would sometimes retire as one man, then after a while they would return again; they were curious without being troublesome. One of the humorous sisters told me that in the rancheria of Santa Rosa, which was my next goal, there was much to be seen that would interest me, if I made friends with the principal men. She also had a house there, she said, which was at our disposal, and she gave us directions as to how to find it, for Santa Rosa was a big place.

It is, in fact, the largest summer rancheria in the Papago tribe, and people from several clusters of winter habitations gather here to the number of about five hundred. The houses are scattered over an area of nearly two miles square. Its native name is Kuátshi (Big Peak). I entered this old-fashioned rancheria with much expectancy of gaining further knowledge of the beliefs and customs of these people. Water from the recently fallen rain was standing in pools here and there in the rough road. Inside of the rude mezquite fences a surprisingly large amount of weeds was flourishing, and beautifully green. In the midst of this mass of verdure the Indians were busy ploughing and sowing, the weeding being done later. Here and there a rain-storm might be seen at a distance, in the north, east, and south, but the atmosphere as a whole was clear, and everything looked beautiful in the late afternoon sun.

After some parleying and searching and travelling, we found our Juan, a tall, strong-looking Indian with a benign expression of countenance. Near this man's house was to be our promised lodgement. He pointed out to us a large, dome-shaped straw house, of old style, about a hundred yards away. Crawling in through the door-opening, which was not quite two feet high, I found the inside very spacious. Provisions were stored here, and a large granary basket gave me joy at the prospect of its possible acquisition. The room was clean and cool. Nevertheless, being unusually dependent upon fresh air, I feared this would be a very inconvenient abode for me, so I crawled out again and addressed myself to an old man who was occupied outside in digging up and destroying the passages of some pernicious red ants. On our arrival I had noticed him clearing away rubbish in front of an attractive little house near by made of upright poles so that the air had access everywhere. I proposed that he should rent me the little dwelling.

He readily consented, asking me to state a price, and I suggested fifty cents a day, which was promptly accepted. He immediately commenced to move his things out so as to give space enough for my cot. The tiny house had a good roof of greasewood branches covered with earth. A few yards in front of the door-opening, toward the west, was the usual arrangement of a jacal that provided a grateful shade. The Indians had arrived here only the day before, and the old man had decorated the door-posts with fresh greasewood branches, which gave the modest habitation a festive and cheerful appearance. I felt comfortable in my new quarters, and prepared to stay here for several weeks.

Among the friends I gradually made was one whose civilized name was Simon, who became of great service in helping me to get specimens and information from the Indians. He made a good beginning himself by selling me his clown's outfit, more or less complete, an unexpected discovery in these days when advancing civilization is destroying all the sacred emblems, customs, and beliefs of the natives. These were implements used at the great harvest feast, *víkita*, which is given every four years at Santa Rosa. The name is derived from the word *víiki*, by which is designated the finest and smallest plumes of the vulture. Manifold preparations are made for the event, which comes off in the "inner bone" moon, about November or December, after the harvesting of corn, beans, pumpkins, and melons. The participants dress up and practise their parts in a large, open, square enclosure of brushwood fences, where afterward many ceremonial objects which were carried about during the festivities are left. I was told that



Front Back

THE CLOWN AT THE GREAT FEAST OF SANTA ROSA

MY CAMP AT SANTA ROSA

sahuaro wine is not used during or after this great festival. At Quitovac, in Sonora, an annual harvest feast, called by the same name, is given in August; this is accompanied by the drinking of sahuaro wine.

As the name indicates, the clowns are the funny men of the occasion, and their apparel and weapons are in accordance with their functions. Their bows are crooked mezquite roots with strings attached. Their ridiculous-looking arrows, four for each, are made from sahuaro ribs, with turkey feathers as the plumed part; like the hunter, the clown has two kinds, but his are out of proportion, three being thin and one very stout. His bracelet may be a piece of unborn deerskin wrapped around the wrist. The most striking part of the costume is the mask, which is made of canvas, like a hood that is drawn over the head; formerly perhaps basket work took the place, at least in parts, of the canvas. Small holes for the eyes have been pierced in it and the top is adorned with a large bunch of plumes from the turkey, hawk, and a black sea-bird. "Horns" made of turkey plumes are attached to the sides, soft down from a hawk being tied to the top. The decorations on the facial part of the mask symbolize clouds. Under the clown's belt is tucked a wooden machete, and large strings of sea-shells run over the shoulders across the chest and back. He wears a huge tobacco-pouch and carries a sahuaro pole on which small greasewood sticks, tied at right angles, do duty as hooks.

His bare arms, as well as his arrows, are decorated each with a spiral line made with chalk and encircling lengthwise, while his legs are daubed in spots, the color being afterward allowed to wear off. At the feast, the numerous clowns perform pranks everywhere; they visit the houses, offer food, and shoot at men disguised as deer. During the dancing they keep in the middle of the dancing place. They neither sing nor talk, though they may do so if requested. If a clown breathes on a sick man, the latter gets well. The mask when not used is kept in the house of the owner, usually in a covered earthen-ware jar. The dignity of the office, which does not imply the necessity of being a medicine-man, is confined to certain families, the father deciding which of his sons is to be the next clown.

On the wall in my lodging-room there was hanging a different kind of mask, neatly made from a gourd, and painted. It is worn by a singer at the same great feast. I also secured this, and during the time spent at Santa Rosa valley I was fortunate enough to make quite a collection of such interesting objects. There are three sections of colors on the singers' masks symbolizing clouds of similar hues. The upper part is painted with red ochre; then comes a black band which is produced by a mixture of sap from the mezquite and oxide of iron; the white band is made with chalk. The zigzags of the red section symbolize clouds, the dots are grains of corn. The designs on the white section denote clouds and lightning. The singers (*víinim*) have the same kind of rattles as the clowns, consisting of a number of the small bags spun by an insect (*attacus orizaba*), with a pebble inside of each, and attached to a band around the ankle.

The band should be cut from the skin of a black dog, which is killed for the purpose in the practising enclosure.

The singer has the upper body nude, his trousers being turned up as high as possible and his feet bare. He wears no head-dress, but attempts to appear neatly attired, tying around the loins a colored bandanna or perhaps a shawl borrowed from his wife. Around the waist, the neck, and the upper part of the arm bright-colored strips of cloth are tied. His body is smeared with red ochre on which are spots of white, symbolizing grains of corn.

An important part of the singer's outfit is the bull-roarer, consisting of two flat pieces made of sahuaro rib, the smaller one being held by the hand when in use. The connecting string should be twine of native cotton, which still may be found in use. They are decorated with symbolic designs, such as those standing for lightning, clouds, turtles, grains of corn, expressing their desire for rain. The buzzing sound produced should be deep, in imitation of the thunder, which brings rain; if the sound is shrill, lightning only will follow.

The bull-roarer is swung for the purpose of calling people together and as a sign that the meeting is over, both at the preliminary exercises in the practising enclosure as well as at the feast itself. These buzzing-implements not only open and conclude the proceedings, but they are used on the way from the practising house to the feast early in the morning, also when the cloud ter habitations we had just left behind. The night was pitch-dark with overhanging nimbus clouds, and thunder, more or less distant, was heard all around us. The air felt sultry and quite a strong wind had begun to blow, as if warning us of an advancing storm. Big fires were burning outside of the houses, which looked hospitable enough. But this was a night which one would not exactly like to pass out-of-doors, so I asked Pablo to hurry in and see if he could not secure a house in which we might have sleeping quarters. As good luck would have it, a friend of ours whose acquaintance we had made at the feast of Noria was here. He had come from the Comobabi Mountains to cultivate the fields with the rest, and he helped us to obtain lodgings for the night. A small storehouse was placed at our disposal, and as we drove up in the wagon some girls were busily carrying things out in order to give us more space inside.

It was a tiny shed, built of upright mezquite poles calked and plastered inside and outside with mud. The roof, which was made of sahuaro ribs and greasewood branches, with a cover of earth on top, was water-proof, all care having been taken to make it secure against the rain, for here the provisions of the family, their household goods, clothes, and other earthly possessions were stored. Air had access only through the door-opening, which was exactly one and a half feet wide. Owing to an all-day's summer sun the storehouse was extremely hot, and as I entered my lodging the temperature was so oppressive that it was almost stifling; still, as the wind was blowing with increased force and lightning at more frequent intervals lit up the darkness outside, the little house offered protection for the night, and gave a feeling of comfort such as our savage ancestors must have felt when resorting to a cave just in time to escape a drenching. Big jars, gourds, sacks containing maize, wheat, sahuaro seeds, and other edible wild seeds were lying about in the corners. There was not much space left, but by adjusting things our baggage was safely stored and we had our frugal supper while the rain poured down.

Pablo went to arrange for his bedding with the Indians, while I managed to place my cot backward from the door-opening, filling up all the space left. Near my head, in a box in a corner, a hen with small chickens was sitting. She had a curious way of poking her beak against the box two or three times a minute, almost with the regularity of clock-work. It was as if the habit of using her beak to help feed her large family had grown on her to such an extent that she continued doing it automatically through the night. To listen to this became a nuisance, but I was too tired to allow it to interfere with my sleep. After a while I awoke from the intolerable heat, bathed in perspiration. I undid my bed to push it through the narrow opening, and leaving the hen to continue her pecking, put my cot outside where the rain had ceased. The air felt cool and fresh now, and at dawn even a feeling of chilliness interrupted my slumber, but I continued to sleep until after sunrise in spite of the cackling of fowls, the barking of dogs, and the Indians moving and talking all around me.

It was Sunday morning, July 25, and I awoke well symbols are carried about, and on similar occasions. When not in use, the implement is tucked under the belt at the back. After the festival it is put away not to be used until the next feast takes place.

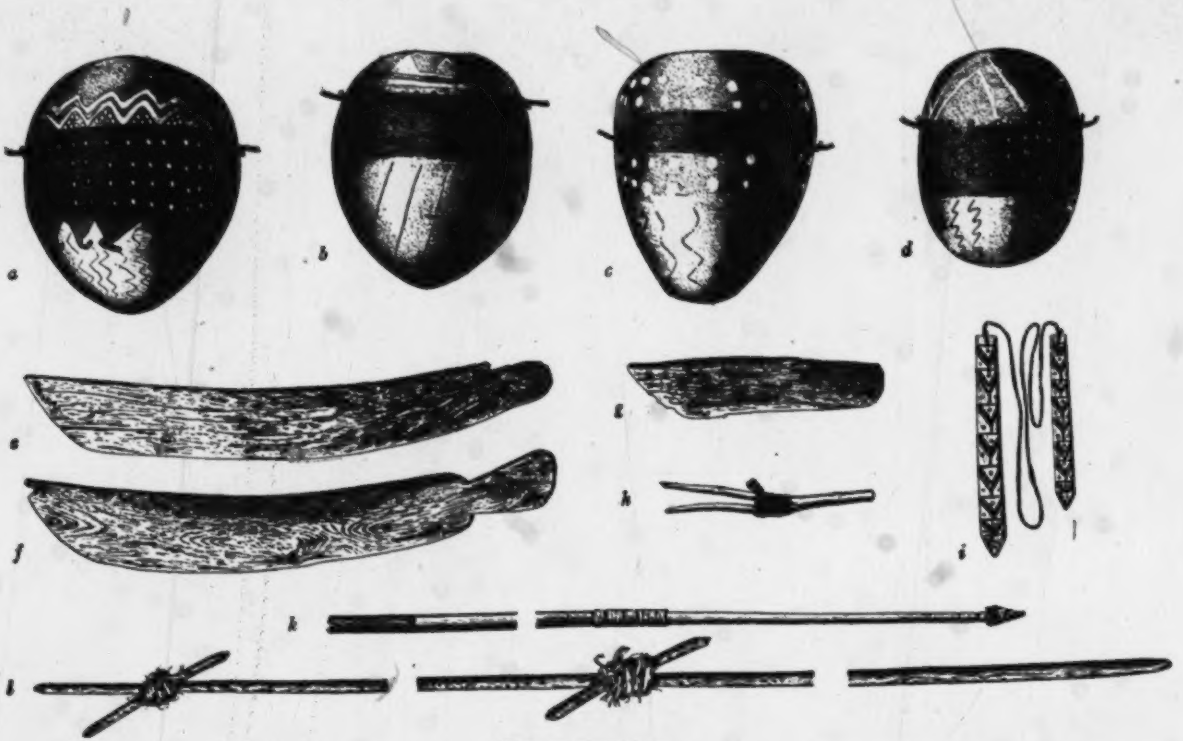
The singers are made up of the following four groups:

1. The people of Santa Rosa rancheria. Sikulhímat, Alóitak, and Kvítatk join with them.
2. The people of Kvívo rancheria. The San Xavier inhabitants join with these.
3. The people of Ánekam rancheria.
4. The people of Áktjin rancheria.

These four groups have different masks and at the head-quarters of each is a practising enclosure.

This great harvest festival lasts from morning till sunset. Ten days before the principal men begin the preparations, fasting at the same time and drinking water but once a day. Sometimes as many as fifty rancherias take part. Much noise is made in the evening before the feast is begun. Each group of rancherias sings different songs, in its turn, and every fourth year new songs are produced. At the Quitovac meeting the same songs are used year after year. The singers also dance with ceremonial objects in their hands, their songs being suited to the emblem carried.

Mr. Brownell, store-keeper and mine-owner at Brownell, in the Quijotoa Range, was present at the last festival given, which was in December, 1908. Though unable to give me any descriptive detail, he assured me that it was an unusual performance in its magnitude and barbarous display of costume, paint, and ceremonials. A



PAPAGO ETHNOLOGY

a (Santa Rosa, height, 19 ctm.); *b* (Kvivo); *c* (Ânekam); *d* (Âktjin): Singer's masks. On the red (upper) section the zigzags mean clouds, on the white (lower) section the zigzags mean clouds and lightning; dots symbolize grains of corn. *e*, length, 77 ctm.; *f*, length, 76 ctm.; *g*, length, 41 ctm.: Ancient wooden hoes from Ânekam, used by women. *h*, twig of greasewood, used for scratching oneself when on salt expeditions; length, 18.7 ctm. *i*, bull-roarer; the triangles symbolize clouds; the lines (red) descending between the triangles indicate lightning, and the dots are corn, length of longest, 50.7 ctm. *k*, old Papago arrow, with obsidian point, from cave in Baboquivari range, total length, 1 metre. *l*, stick for bringing down sahuaro fruit; total length, 4 metres.

few other Americans had been present, but nobody was allowed to make any notes. Permission to take photographs would not be considered without a payment of six hundred dollars. It is doubtful whether a similar festival will ever take place again, for there are only one, or possibly two, old men left who know how to direct the complicated ceremonies. Formerly, the complaint was made to me, the young men used to be taught by the two old men, but at present nobody goes to them. If another festival does take place, it would be highly desirable for an ethnologist to be present. I visited the practising enclosure, which is from forty to fifty feet square. A great accumulation of ceremonial things was left here from preceding feasts, conspicuous among which were some large, triangular frames to which wads of cotton were attached, symbolizing clouds. Bright blue, wooden swallows, fastened to the tops of sticks, also attracted my attention. They are carried by certain performers. The enclosure is called a váaki, as is also the medicine lodge and the house of the leader of the salt expeditions.

I was successful enough to procure two more clown masks, the owners of both being medicine-men. One of them, who was too old to be a clown any longer, should have handed it over to his son or nephew, but he preferred American dollars. I was further completing my collection with sets of the various articles that comprise the outfit, when my nefarious activities reached the ears of the principal men, who at once put a stop to any more purchases. "What are we coming to," cried the chief, "selling these things? Are we not going to have any more feasts?" There was some talk of having me return what I had bought, but the storm of indignation gradually subsided.

CHAPTER VII

VISIT TO A VERY SACRED PLACE—THE CHILDREN'S SACRIFICE —A MEETING WITH AN IMPORTANT PERSONAGE—ÁNEKAM— PRIMITIVE NATIVES—I ARRIVE AMONG THE KOHATK PEOPLE —A WET NIGHT—RETURN TO SANTA ROSA

All the while I had not forgotten what my talkative woman friend at the last stopping place had told me. "Get an old man to show you the children's cemetery," she said, "and you will see many things." As soon as I considered my acquaintance with Simon to be sufficiently well established, I asked him if he would not take me to the place where the children had been buried. "It would be well to get the chief's permission for that," he answered after some hesitation. Accordingly Pablo and I mounted our horses and, accompanied by Simon, also on horseback, started off with the prospect of an interesting afternoon's experience before us. The place was not far away, perhaps three miles off, but it was already five o'clock and, as we first had to secure the permission, we hurried along.

Simon is very quick in his movements and, there being no time to waste, we confidently followed in his wake. We arrived at the camp of one of the principal men, a leader of the annual salt expedition to the gulf, with whom on the previous day I had had a long interview. He was one of those old-fashioned, simple-minded, though intelligent, barbarians who give the serious inquirer clear, absolutely straightforward information, and I had no objection to hearing from his mouth some more about the ancient traditions of the Papago. He told us of a spring that once had threatened to flood not only the great valley of the Santa Rosa, but the whole Papago country. Four children, two boys and two girls, had to be put into the fountain in order to stop the water from flooding. The sacrifice had availed and ever afterward this had been a most sacred locality, of which the Papagoes took great care. He asked us what we wanted to do there. Being assured of our harmless intentions, and Simon being a great friend of his, he had no objections to our proposed visit, and I paid him two dollars for the permission.

Our next call would be, I expected, on the chief. Simon, on his quick-gaited steed, rode ahead of us, and soon disappeared from view in the winding arroyo, which we entered. This arroyo led among the scattered ranches of Santa Rosa up to the base of the mountain range, where lay the object of our trip. On an easy grade we travelled quickly over the sand and gravel that the rains of previous years had washed down from the mountains so as to fill the arroyo bed. On both sides grew thickets of desert willows, arrowbushes, and a peculiar light green bush with long, needle-like leaves, from which the Indians make prayer-sticks. We followed this beautiful arroyo for a couple of miles, and I was congratulating myself on getting away unobserved by the multitude. Pablo and I spurred our horses along and we gradually gained on our swift guide, who suddenly left our safe arroyo, now narrowing as we approached the base of the mountains. We passed a couple of hundred yards above the last houses of the rancheria and were making fast for our goal, when a man on a brown horse appeared, coming toward us at a furious gait, followed by a white colt. Just as we reached the main road he caught up with us. Although he preserved a calm demeanor, his eyes, when he halted us, betrayed excitement. It was the old familiar case of Indians knowing in a mysterious way well-nigh everything that is going on, as if they had telephones and telegraphs.

"Where are you bound?" he asked. Simon looked scared when answering the question.

"That place," the new-comer retorted, "belongs to many people, and one man alone cannot give the permission to visit it. I am the chief of this rancheria. Why did you not come to me?"

Simon evidently had committed a serious breach of etiquette by letting the matter rest with his friend, the director of the salt expeditions. He tried to explain his action as being due to the absence of the chief in the fields. For a man with so much initiative and such unusual frankness, it seemed amazing that he should have made such a blunder. Judging from the way he repeated over and over again his one line of defence, his case was a weak one. The chief evidently was right, and finally, turning his horse toward the rancheria and starting back, he said he did not want us to go to that place.

This was more than I could endure, so I, with Pablo, rode after him, and began negotiations in my own way. He soon became more tractable. "The place is sacred," he said, "and not everybody who comes along can see it." The Indians had gone to much trouble to keep up its proper appointments. He was going to bring this matter before the Big House, the lodge, that very evening, and the people would decide in the case. The prospect of vague and possibly endless delay was not exactly to my taste, so I proposed another way out of the difficulty, that of paying to him and ~~to~~ the other big man of the tribe, the Keeper of the Smoke, the same sum that I had already paid the first principal man.

Gratified at seeing the negotiations happily concluded, I presented him with tobacco and candy, which he smilingly put into his trousers pockets. He said we could go to the cemetery that afternoon and next morning return to look it over more carefully. To my suggestion that it was too late in the day to continue the trip, he answered that the place was close by. He admonished us only to be careful not to disturb anything, and thus we separated all in a pleasant mood. The cemetery was nearer than I had expected; after having followed the road for ten minutes, Simon told us that we had arrived. The country was now level and covered with greasewood bushes all around. We found ourselves at the beginning of a broad pass, through which the road from Santa Rosa leads westward to a mountain.

We tied our horses and walked aside from the road some twenty yards, when my eyes caught sight of a circular enclosure made from upright split ocotillo (*fou-*

quieria splendens) poles, from which the bark had been recently stripped. To the north and to the south was piled up at either side in a semicircle a very large heap of discarded poles, in orderly array, several thousands of them. I had expected to find a shrine of a more or less common type, so this was an agreeable surprise and worth some trouble.

I stepped up to the sanctuary, which was about the height of a man and nineteen feet in diameter, with open gateways toward the four corners of the world. The row of ocotillo poles was placed two or three thick. Inside, in the middle, was a mound neatly made of slabs, six feet in diameter and two feet high; on top of it rested a large sea shell, seven inches long, of a light rose color, with its opening toward the east. Two thin upright sticks of ocotillo had been placed at each cardinal point of the mound. The shrine stands on ground that is a few feet higher than the surrounding plain. This slight elevation, which provides ample space for the enclosure, is evidently natural, though its central part is slightly concave. This may have been due to the action of a spring. It looks as if the earth in some way had been removed, forming a slight basin. From this depression, toward the east and the west, are outlets as if water had been running. The western outlet is quite short, but the eastern is over one hundred feet long, and widens out so as to present broad, level ground. Here it is where the water finally stopped, the Indian explained, and here may be observed eight good-sized single stones or heaps of stones. Near each are placed two upright ocotillo sticks, one toward the east and one toward the west. The four eastern stones or stone heaps have only one each, placed toward the east.

Everything about the place was scrupulously clean and orderly; not a trace of anything to be seen on the sandy ground anywhere. The mound of slabs that kept the water down in the bowels of the earth, and prevented the country from being flooded, was well arranged. Though mainly a prayer for rain to the sea, in a way this was a monument to the four children who had been sacrificed, and though devoted to a mythical event, its extreme simplicity, relieved against a background of the simple mind of the natives, was impressive, as the sun, at the end of July, in close proximity to the western hills, poured its strong, beautiful light over the scene.

Fearing a refusal, I did not ask Simon's permission to photograph, but, putting up my tripod, calmly brought my camera into action. Hardly had I begun operations when Pablo shouted: "People are coming! I see dust rising in the west." Although photography had not been included among the sacrilegious acts mentioned by the chief, still it required little sagacity to be convinced that, with the Papago abhorrence of the noble art, to be caught photographing such a place would amount to a crime. I had made a few exposures and now hurriedly put my camera and tripod together. Simon evidently felt very uneasy and, with his feet, began to cover with sand the marks that the tripod had left, making similar holes here and there with the sharp end of a pole, at the same time throwing sticks of wood about, to mislead his

SHRINE OF THE CHILDREN'S SACRIFICE, SEEN FROM THE WEST
The large heaps are discarded ocotillo sticks

SHRINE OF THE CHILDREN'S SACRIFICE, NEAR SANTA ROSA

EAST OF THE SHRINE OF THE CHILDREN'S SACRIFICE
Here the outflow of water is supposed to have stopped

canny countrymen. Then we started back at a quick pace to our camp.

The name of this sacred place is Áalhihiani (*áli*, child; *híhian*, cemetery). The enclosure's name is *ki*, house. It is renewed at irregular intervals and, according to my informant, sometimes every year. The present one had been made during the preceding winter. Those who make the enclosure have to come on foot to do the work. After the work is done there is a feast in the lodge, the whole night being spent in singing to the accompaniment of rasping sticks. The four children come down from the cemetery and take part, but only the medicine-men see them. In the morning the latter tell the people what they saw and what the children told them about rain and crops.

The faces of the children when about to be sacrificed were painted yellow with transverse black stripes, while the body was painted on the front, yellow, and on the back, black. A hole was dug in which the children were made to stand up, while the medicine-men sang. The flow of water which was stopped came from the sea, threatening to flood the whole world. The Papagoes worship the sea. In the subdivision of the tribe called Hohóla, tradition has it that a man once went down into a cavity in the ground and the sea kept him there for four years. His relatives, considering him dead, burned his house and ate his cattle. He turned up one day, asked them to make a house for him away from the rancheria, and, after having taken eight baths, one every four days, he began to live again as before.

offering. The jar is buried in the ground and a small mound made above it, the central part of which is covered by a flat stone. Ocotillo sticks, stripped of bark, are placed upright, two toward the east and two toward the west, and empty cartridges, bits of glass, small seashells, as well as pebbles, had been deposited here. The little shrine is just outside of the rancheria, toward the end of the slope that runs down gently from the mountains near by. The rain-water, in times gone by, had formed furrows and small arroyos everywhere, making the country look wavy. The earth around the roots of the ever-present greasewood bushes resists the short-lived torrents, and they presented the same appearance of growing high above the ground on top of mounds which usually is due to the action of the wind. At one place where the ground was level a vast number of light yellow flowers were growing, forming a carpet-like covering among the greasewood. Quantities of broken pottery were lying about to the north-east of the small shrine and here, according to tradition, was the former site of the rancheria.

In spite of my satisfactory meeting with the Keeper of the Smoke, he seemed to have efficiently blocked my purchase of any more important objects, so I decided to make a tour of the several rancherias to the north, where the sway of my uncompromising and despotic friend did not reach; perhaps on my return conditions might change. The next rancheria to the north is Ánekam, hardly three miles away, but it is a community distinct from the preceding one and even more primitive. In ordinary weather the inhabitants of one place can hear the singing of those at the other on festive occasions. The days were warm now, hardly any day registering less than 100° F. in the shade, often more. But climatic conditions matter less than the attitude of the people one meets, and here there was an unexpected charm of simplicity and unobtrusive inquisitiveness which reminded me of former happy occasions in my life among natives. A sahuaro feast had been concluded the day before. People from the surrounding country were still lingering and my arrival furnished an excuse for an additional delay. Crowds of people, fifty or more, kept around me wherever I went.

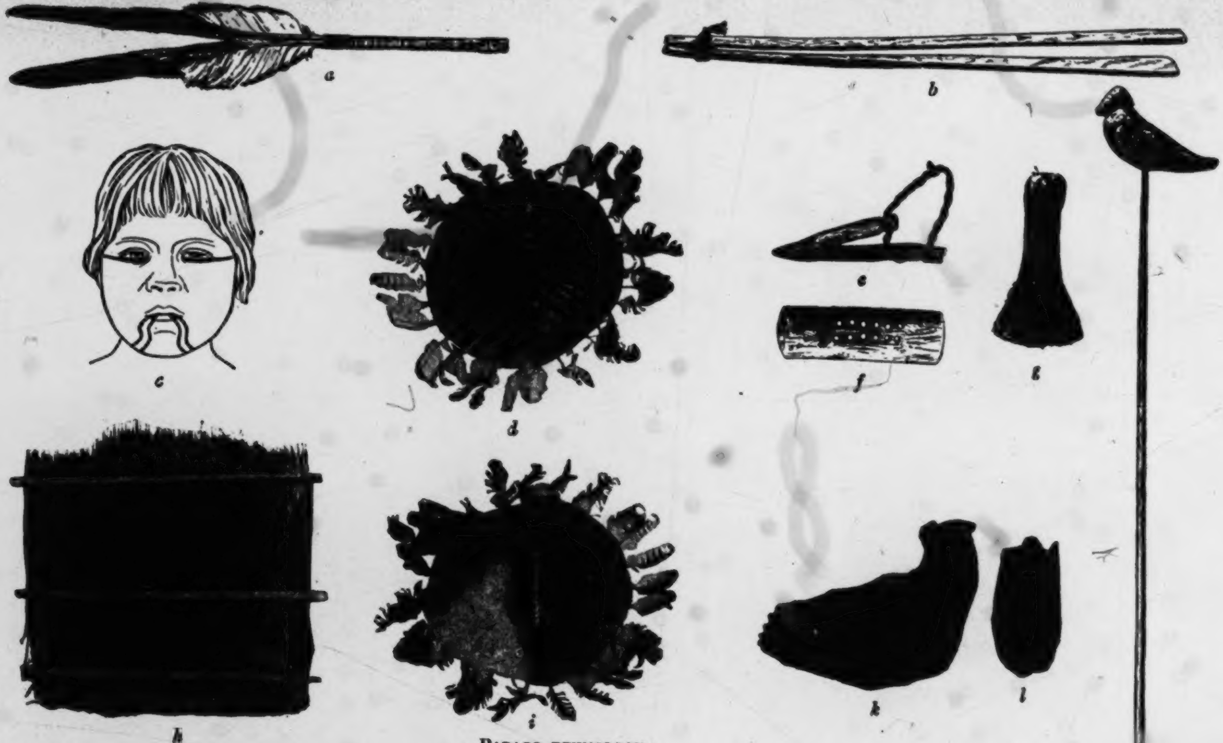
The Papagoes in the Santa Rosa valley are less spoiled by contact with civilization than in any other part of their country. From my note-book at this time I take the following remarks: "I have never yet met with a cross Papago; they are always amiable. In my quest for specimens they smilingly admit me to their store-rooms to inspect their fine granary baskets and other kinds of baskets and utensils, and allow me to look around inside and outside of the houses as much as I like. On the other hand, they have no tact; they seat themselves unconcernedly in a folding easy chair of mine, or go to the box in which I keep my collections and take out all the things to look at. They are always on hand at meal-times; they dive with delight into the box of crackers set before them, and are very fond of coffee."

They were rather a crude type, but pleasant to deal with, and were continually bringing things for me to buy.

At Ånekam most of the middle-aged women and some of the men had their faces tattooed. These facial markings are dark blue in color and not elaborate. Common to both sexes is a thick line under the eyes, passing the outer angle of the eye and continuing parallel to the mouth until it nearly reaches the hair. This is almost becoming, reminding one of the way actors darken the eyelids. Men have besides markings on the forehead, and women, on the chin, have waving parallel lines descending from each corner of the mouth. Tattooing has been discontinued; the marks used to be applied with thorns from the sahuaro, taken from the top of the plant, and the charcoal of greasewood. Its purpose is somewhat doubtful. For men the reasons given were to draw blood from the eye; for women, to avoid getting wrinkles early. Generally women were the operators. After having been tattooed, salt was not eaten for a month.

A curious case of a woman nursing her two children of different ages came under my observation here. When seated, she had the younger lying on the ground in its primitive cradle with the large detachable shade, while the larger one, a boy of four or five years, was playing about. He would frequently run up to his mother and demand his rights which were never refused. Standing up with a large straw hat on his head he enjoyed the mother's milk usually reserved for children of more tender years. Sometimes children who are able to walk are kept in the cradle.

The wellnigh universal superstition relating to flint



PAPAGO ETHNOLOGY

a. Medicine man's plume; length, 60 ctm. *b.* Wooden tweezers used in pulling off certain cactus fruit; length, 38 ctm. *c.* Tattooing marks on woman. *d, i.* Front (diam. 44 ctm.) and back (diam. 44 ctm.) of cowhide shield used in Apache sham battles. *e.* Wooden spur, attached to one (right) foot; length, 16 ctm. *f.* Wooden implement, found at a tomb; length, 22 ctm. *g.* hair-brush of fibre; length, 15 ctm. *h.* Door to grass hut; at present made from wheat straw; height, 98 ctm. *k, l.* Bags of fibrous matter, caused by woodpeckers' work in the sahuaro; serve as canteens and cups; height of the smaller one, 17 ctm. *m.* Bird, made from yucca root and painted blue; carried upright at the Santa Rosa feast; length of bird, 8 ctm.

arrow-heads is also found among the Papagoes, though one would think that sufficient time had not elapsed since the days when the natives themselves made such objects. Their very name is lightning stone (*víhom*), and one man who presented me with one assured me that he found it by searching the ground after lightning had struck near his house. Sometimes, when lightning strikes a tree, the Indians will dig in the ground underneath for arrow-points. It should be noted in this connection that these Indians fear lightning, although they are not afraid of thunder. Bows and arrows are still used in Ånekam in hunting rabbits, quail, doves, etc.

Our next stop was made at Kukômalik, fourteen miles further north, a new rancheria which owes its existence to a fine well left by Americans who had to abandon an attempt at cattle-raising. At only nine miles' distance from there, in the north-west, is Kohatk; this is the first Pima rancheria, and the principal one of four rancherias or villages which are found in a small extent of country hardly thirty miles long, beginning immediately south of the Casa Grande station on the Southern Pacific Railroad. It may be termed the Kohatk country, being inhabited by the Kohatk people, who are Pimas that have, to some extent, retained their originality. They have, at least, been less affected by the white man than their confrères at the Sacaton Reservation, and may possibly for a few years offer a fair field to the student. The country traversed after leaving Ånekam was singularly devoid of animal life. Not even a jack-rabbit seemed able to live here. The prevalent vegetation was, as usual, greasewood with salt bushes now and then. Low sand dunes were visible here and there.

The Pimas of Kohatk I found to be good-tempered, affable people. The women cut their hair in front so as to have bangs and they are good-looking. These natives seem to be somewhat under Roman Catholic influence and have abandoned their native feasts. Photographing was as much detested here as elsewhere. The sight of my camera would make the children take to the woods and the old men hurriedly disappear on hands and knees into their dome-shaped huts.

I heard neither English nor Spanish spoken, but the inhabitants have adopted the frontier man's way of living, frying their meat in lard and adding quantities of it to their beans. They buy white flour and make unwholesome tortillas in boiling lard. This heavy, poorly cooked food forms their daily regime, without any variety. A small bucketful of coffee is distributed at meal-time both in the middle of the day and in the evening. They possess cattle but, like most white ranchers, are too lazy to milk the cows. The meals are appropriately served on plates of cheap crockery and cups bought in the white man's stores. The participants give audible evidence of consuming more lard than is good for them, and, were the facts known, "to be as dyspeptic as a civilized Indian" would be an adage. Think of the anomaly of leaving wholesome, natural, well-cooked dishes for a diet of lard and the cheapest kinds of canned goods.

Contrary to the universally accepted opinion, the cuisine of barbarous Indians is excellent. To be sure, they have few dishes, but there is variety enough, and an important fact is that the food is never "killed," *i. e.*, overcooked, as is the all too common habit of the poor white man; the food retains a natural, pronounced flavor of its own, unknown to most whites, besides having all the life-giving elements. After all, nothing tastes as well as the simple things, well cooked. What is better than the whole wheat cakes of the Papago Indians of Sonora? They are nature's genuine gift to hungry men, furnishing at the same time extreme satisfaction to one's sense of taste. I know of an American who came across this dish fit for kings in a corner of Sonora, to whom it was such a revelation that he ordered two sacks of the flour to be sent to his distant home. The primitive Indian way of cooking beans in clay vessels without lard is unsurpassed for preserving the inherent flavor of the bean. No one can cook squash as my modest Indian hostess or make an *atole blanco* (thin gruel of maize) like hers; even the Mexican women cannot compete with her in this. The green corn that is offered in early autumn in fashionable restaurants in New York as a native delicacy ought to bring a blush of shame to the chef's cheeks, watery and devoid of flavor as it is.

Apart from the stultifying process of jumping literally, as the saying goes, from the frying-pan into the fire in their effort to imitate the white man, there is a very sad feature connected with the abandonment of native dishes. Indigestion and a one-sided diet undermine the strong constitution of the Indian, enfeeble his blood, and leave him with little power of resistance to his great scourge, tuberculosis. According to my interpreter, who is an observant man, it is no uncommon occurrence among the Papagoes who have adopted the white's man's cooking, even to die from indigestion. Next to brandy, lard is the greatest curse civilized man has brought to the Indian.

After a warm and cloudy night we had the somewhat rare experience of four hours of rain in the forenoon. Still, in the afternoon, as the rain had not been so very heavy, we decided to return to Kukómalik, thinking we might get there in an hour and a half by driving a little fast. We made our way very well up to about a mile within our destination, when our horses began to encounter difficulties. The land here was slightly depressed and therefore retained the newly fallen rain as a reservoir on its alluvial soil. The ground became very soft, and finally, in spite of heroic efforts, our horses could pull no more. The night had overtaken us with darkness, deep as in Egypt of old. Pablo went to look for a team to pull us out, while I remained behind trying to light a candle which the insects aggressively put out. At ten o'clock the moon rose and made the outlook a little bit more cheerful.

A fresh team of Indian horses after a while came splashing through the water, but they proved inadequate for the task, and we had to camp where we were. The mud was of the kind of which adobe is made and stuck to our shoes like clay, but there was no necessity for walking around much. There were a few mezquite sticks lying about, and lots of resinous toviso bushes were growing near, so we could make a fire and had excellent beef soup. Pablo arranged a comfortable bed for himself by pulling up a number of the same generous bushes. I also helped my dog to secure comfort for the night, his usual tactics being to lie down on top of a bush, thus pressing the branches to the ground by his weight. As for myself, I again enjoyed the usefulness of my folding cot which, on account of its height, prevents any discomfort from boggy or slightly uneven ground. There were some mosquitoes about, but I slept well after smearing my face and hands with an effectual protection of French-Canadian origin which I can confidently recommend. It consists of seventeen parts olive oil, one part carbolic acid, and two parts oil of pennyroyal. The humidity of the air, however, was surprising, for my blankets were found in the morning to be thoroughly wet, as if they had been exposed to rain.

Shortly after sunrise our Papago returned with his two horses and a shovel. The four horses stamped timidly in the mud and could not at first be brought to pull together. Through continued and frantic efforts on the part of us all, the wagon moved forward again. After having spent a few hours at the rancheria drying our things in the warm sun, we returned to Ánekam where people were glad to see us again, and the next day found us once more at Santa Rosa in the evening.

CHAPTER VIII

SCORPIONS—A STORM IN THE DESERT—HOW THE SAHUARO WINE IS MADE—THE SAHUARO FEAST AT SANTA ROSA—A GREAT RENDEZVOUS—SOCIAL AMUSEMENTS OF THE PAPAGO—SUCCESS AT COLLECTING SPECIMENS—STUCK IN THE MUD—WONDERFUL CHANGE IN THE LANDSCAPE—A VALUABLE VEGETABLE—PARTING WITH PABLO

My little house in Santa Rosa I found occupied by guests who had arrived to take part in the much-heralded sahuaro feast that was soon to be celebrated. I, therefore, drove the wagon up to some erect poles, the remnants of a shed, and put up my fly between these and the wagon. During the night I awoke from what first seemed a disagreeable dream, but which proved to be an intense pain in the little toe. I applied some extract of rattlesnake beans, which a friend of mine had induced me to take along as a ready remedy against the bites of poisonous snakes and other troublesome creatures. The pain seemed to come from the nail, as if it were being forcibly bent backward, but after a couple of hours it subsided sufficiently for me to fall asleep again. In the morning the foot was swollen and I could not wear my shoe, but after twelve hours I was all right again. Perhaps the mischief was due to a small scorpion, though the Japanese doctor in Caborca, to whom I related the occurrence, seemed to think that it was a case of a very poisonous ant of Arizona noted for the extreme pain caused by its bite.

There is a large scorpion (*hadrurus hirsutus*) found in these parts, four and one-quarter inches long, which, however, is not as poisonous as the smaller species. Late one evening, while searching for something with my lantern, I came across one running along the ground, and which appeared at first sight to be a mouse. It was killed and left in an open vessel to be put in alcohol the next day. In the morning I found that the ever-present and hungry hens of the Indians had already taken care of it. With the exception of scorpions, there are not many obnoxious creatures in the region. Rattlesnakes, of course, there are, but they should not be classed in the same category with the rest, because they always give warning of their presence, besides being perhaps the only snakes known to be good-tempered. According to the Indians, few horses and cattle are bitten; they know the rattlesnakes and turn away when they hear the sound; dogs also know them. Children in the West have been known to lift them up unharmed, and the extraordinary performance of the Hopi Indians carrying them alive in their mouths may be called to mind. I never like to kill a rattler.

On Sunday morning, August 8, dark, nimbus clouds were gathering in "threatening" fashion, as the inhabitants of countries with normal rainfall would say, but here where the very existence of the people is dependent on a few showers in July and August, they awakened joyful expectations. The prospect of rain was at that time uppermost in everybody's thoughts, day in and day out. It means success in raising crops, the filling by the

Next morning I had an appointment with the Keeper of the Smoke. Some days before he had promised to make for me a shield of the same kind as the Papagoes until quite recently were in the habit of making when going on the war-path against the Apaches. As this is a solemn act, which entails much fasting and praying on the part of the maker, and also as it would mean, according to Indian notions, certain risks and observances on my part, we had agreed on a meeting at which I should be enlightened as to my duties and dangers in the matter.

Accompanied by Pablo I arrived at the medicine lodge at the appointed hour, which was "a little after the sun is over the horizon." We found the keeper sitting under the jacal in front of the lodge and facing the east. He was a stern, almost fanatical-looking Indian who conscientiously observes all the rules and regulations his religion imposes on him. There was no English or Spanish about this man. "I do not do things from hearsay," he began. "Every evening I make a fire east of the jacal (in the winter it would be inside the lodge) and tell the people what I know to be the truth. In this house I tell the people what to do, and this is the place where any undertaking should begin."

He spoke for nearly an hour. The shield he would make alone, and the proper precautions would be taken, but he wanted to be assured that I would not trifle with it, and that I should help in its making by fasting. "People have sold you clown's masks and singer's masks," he continued; "that is very wrong, and should never have been done. The merit of the feast passes away with those things. They ought to be returned, but I am not going to ask you to do that, because the things have been paid for, so it would not be right to have the bargains changed. But I want to tell you one thing which you probably do not know. Those objects are apt to make you ill, and when that happens, do not blame the Indians!"

When the time came for me to answer, I reassured him on the several points that caused him anxiety. The things I had acquired were going to be well cared for. I expressed my pleasure at the elucidation his talk had given me, and told him that I should like much to have another meeting with him by and by. He believed in me, he answered, and would meet me here again later on, but at present he was too busy making ready for the sahuaro feast which was soon to come off. He was glad to see me among his people, he added.

Next day, availing myself of the permission already obtained, we again visited the "cemetery" as well as other sacred spots in the neighborhood. I was shown the place where the elder men, sitting in a circle, make the small, bright blue prayer-sticks for the great harvest festival. One end is pointed, and to the other is tied a turkey feather; about two hundred and fifty of these are distributed at the feast in the interest of health, and some are buried later, to keep the fields moist.

The shrine of the buried jar is situated at the crossing of two tracks, one leading to the "children's cemetery," which is west of it. It is customary for those who visit the latter place also to call here and deposit some rain of dams and rock cavities, which will ensure drinking water for man and beast until the next summer and the growing of grass to keep cattle and horses alive. People of the desert learn, however, to be very patient about the arrival of the blessed water of the clouds and conservative in their estimate of rain prospects. Usually the clouds pass away to reappear again the next day and many more days, resulting often in mere gusts of wind. Since early morning we had heard thunder in the south-east, and later also from the north-west and west. Lead-colored, heavy clouds were gathering everywhere. Still, when the storm came, it took us somewhat by surprise. Even the Indian visitors had their bedding left on the ground when the dust storm, the advance guard of the rain, fell upon us, travelling forty to fifty miles an hour.

Pablo and I hurriedly rolled up my bedding, putting that and a few important things that I could seize in the short time allotted inside of the ancient house with the small entrance. The rest, among them a camera and a box containing films, I covered as well as I could inside of the wagon. Pablo, as usual, did not have his ropes ready to fasten the wagon cover securely, and it threatened to blow away. In shorter time than it takes to tell it, the rain was upon us. He threw his quilt into the opening of the cover to protect the baggage and collections; then he hurriedly made his escape into the hut where I had just sought refuge from the fierce outburst of rain and wind.

The storm abated somewhat ere long, but was immediately succeeded by others, and when finally, after two hours, the weather calmed, the arroyo at the back of the houses was roaring as if in joy at being born a river again. Before the rain was over the children were playing in the newly made ponds. Soon the grown-ups appeared on the scene, all much animated. While Pablo and I started to dry and clean our things, they enthusiastically resumed their interrupted preparations for making the wine, which was to play such an important part in the approaching sahuaro feast. Juan had already evacuated his hut the day before in order to devote it to wine making. Early in the morning men had brought large earthen jars belonging to his and the neighboring houses, and the jars were now resting safely in cavities that had been dug in the earthen floor of the hut, twigs of fresh greasewood as usual forming their immediate support.

As soon as the rains ceased a procession of women started off to fetch the necessary water for the wine making. The cheery women, each superbly supporting a shining olla on her head, looked picturesque as they walked one after the other through the greasewood bushes in the beautiful light after the storm. Two trips had to be made and the full jars were all deposited outside of the house, to be used as soon as the clay vessels containing the sahuaro sirup were opened; of these there were a dozen medium-sized on hand, all neatly sealed.

About one o'clock in the afternoon the solemn work of mixing the sirup with water began. Two young men seated on the ground under the jacal in front of Juan's hut and facing the east began these operations. The sweet stuff was first poured into a large and deep water-tight basket, with symbolic designs in the weaving, one placed before each young man. Water was poured into this, in the proportion of two-thirds to a third part; sometimes half and half is used. The operators, who had their shirt sleeves turned up to the elbow, mixed according to rules and regulations. Slowly stretching their hands, palm down and forward, over the fluid, they would immerse them and draw them along the bottom toward themselves, then rubbing the hands twice against each other over the fluid. This was repeated several times. As a change they sometimes dipped them into the liquid, lifted up what the two hollows of the hands would hold, and rubbed it into foam, continuing rubbing until the foam disappeared. An elderly man then tasted the mixture, carried the basket into the house, and emptied it into one of the big jars. This procedure of mixing lasted nearly four hours. In the same way the brewing of the much esteemed wine was commenced that day not only in the Big House, but in many of the private dwellings of the great rancheria. Usually several families unite forces at one house and, when the official feast of two days is over at the lodge, people gather at the houses to drink and get drunk.

Shortly after sunset that day, the loud voice of the herald who calls the meeting to order, sounded from the lodge. His exhortations lasted several minutes, and although I at a distance could not distinguish the words,

Desert willow in bloom, June

Papago woman carrying water

The dam at Santa Rosa. Made by the Papagoes

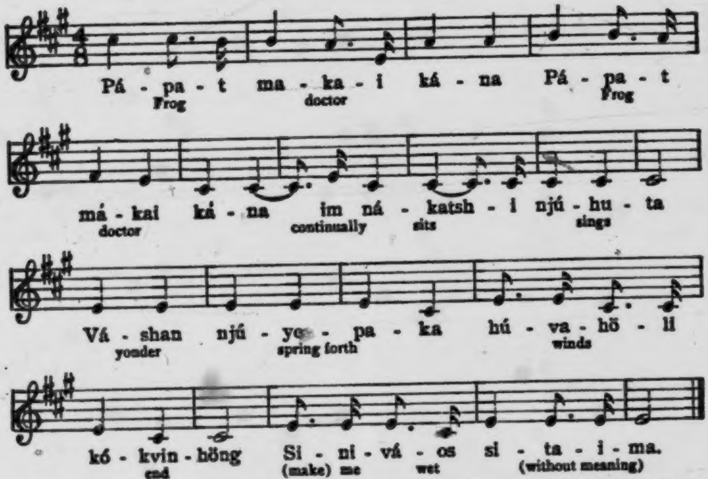
I have no doubt that his voice, which rang clear in the quiet night, carried over the entire rancheria. What he was saying was, of course, known to everybody; hearing the call was enough to summon them for the important event. People were slow in assembling and the dancing began late. The long string of eagle plumes over the dancing place, that had been a prominent feature in the arrangement at the former sahuaro feast in which I took part, was missing here. During an accidental fire in the house of the keeper with the ominous name, the sacred emblem had literally gone up in smoke. A band of medicine-men, some of them called from a considerable distance, were making up for the defect. There were four of them inside the circle, walking around in a row, moving their plumes and invoking the rain. At times they would dance about like children gesticulating wildly with their plumes. Two of them wore cast-off garments of whites, and one in a long, smart-looking mackintosh, looked especially ludicrous, cutting extraordinary capers to induce the rain to come.

The dancing and singing were on a much larger scale than at the feast I had previously attended, as befitted such an important locality as the Santa Rosa. The leading singers, as well as a few of the others in the circle of about a hundred dancing and singing men and women, had astonishingly powerful voices. There was an atmosphere of order and sincerity and devotion among the participants. Very noticeable was a woman leader, who walked next to the man who, swinging his rattle and singing, leads the whole procession. She had an extraordinary soprano that would have done credit anywhere, untutored to be sure, but rich, sonorous, and of great force. She was the wife of the Keeper of the Smoke, and had a married granddaughter!

For about an hour I danced and sang, making my way in among the leaders. Their singing was almost deafening, and after a while I walked home to my camp, enjoying the singing better at the distance of a mile. The next night, near my bed time, it sounded especially well; they were singing the "Frog Doctor," a song about rain and moisture that I had learned, and which has the distinction of being in the major key. I could

THE "FROG DOCTOR"

A PAPAGO RAIN SONG HEARD AT THE SAHUARO FEASTS


Pá - pa - t ma - ka - i ká - na Pá - pa - t
Frog
doctor
Frog
má - kai ká - na im ná - katsh - i njú - hu - ta
doctor
continually
sits
sings
Vá - shan njú - ye - pa - ka hú - va - hö - li
yonder
spring forth
winds
kó - kvin - höng Si - ni - vá - os si - ta - i - ma.
end
(make) me
wet
(without meaning)

The frog is thought to possess powers of a medicine-man (makai). Being connected with water he is, according to Indian belief, able to influence the coming of rain and is therefore implored to assist in bringing moisture to the earth.

follow the words at that distance. In their enthusiasm they seemed to be trying to wring the rain from the gods, and above them all could be heard that wonderful soprano. Every time a new stanza came around, they intoned as is their custom the first words with all the power of their lungs, giving the singing a triumphant expression.

During the two nights of singing and ceremonies, the wine was getting ready for consumption on the third day, at which time people gathered outside the lodge to the number of some five hundred, including many who had not taken part in the exercises. Many came to drink wine at the houses of their friends and relatives, and had been invited from such distant places as Florence on the Gila River and San Pedro in Sonora, everybody first having been present at the distributing of the wine at the lodge.

Young boys on horseback had been in evidence in the morning, racing joyously with each other and raising dust wherever they went. Some of them were prematurely under the influence of liquor, the result of the inroads of civilization. It is characteristic of the primitive Indian to be strict and formal in his religious observances, but after the festival, when the gods have had their share, he, too, wants a good time and takes it. The rising generation, breaking away from their native customs, make no such fine distinction.

People came on horseback or in wagons, some of them in light carriages; one well-to-do Indian from the northern part of Baboquivari arrived in quite a smart turnout with two white horses and had a well-fed dog running alongside. He wore spectacles and brought his family with him. It was a curious assemblage in the desert. There was as yet no shouting to be heard or any other noise than that of wagons rolling and horses galloping over the sandy ground, but the scene was one of bustling activity that reminded one of a race-track meeting.

The ceremonies began at noon and only a minority of those present could sit down on the dancing place and take an active part; most of them had to be spectators, standing or sitting on their horses around the square of human rows. Beyond these, wagons had been drawn up which were filled with standing spectators. The chief passed me in the throng and said he was glad to see me at the feast. He hoped I would make the most of it and see everything; I thought he might have invited me to take a seat among those on the "ground floor." However, any one who liked was free to do so if he were able to squeeze himself in. As it was, I preferred to be where I stood.

People were in their very best finery, and some of the women were a sight to behold in gaudy colors, not exactly the cheapest stuff, for the present-day Papago is well-to-do and wants the best, although he does not want to pay high prices. The most conspicuous dresses seemed to be made from mercerized silk, very thin, and were fair copies of the prevailing fashions among white women in town or on the ranch. The Papago woman is clever and cuts her clothes herself, sewing them on the machine, which she owns or borrows from her more fortunate sisters. Petticoats are considered less necessary. At Juan's ranch, on which was my camp, the women folks had been working for two days to get their dresses ready for this occasion. Until midnight the running of the sewing machine could be heard from the little house I had at first occupied.

The ceremonies and speeches proceeded in the same manner as those I had witnessed before. The wine was distributed only to the fortunate ones seated in the square, and there was not much of it either. After an hour the whole affair was over and people dispersed to the different houses, where the brew of the season was awaiting them. To be present at the revelries which followed was not pleasant. It was a good-tempered crowd, but drunken people are nuisances, whether in civilization or among barbarians. However, if anything, there is some excuse for a barbarian to get drunk, for he thinks it is the will of the gods, and that it helps to bring about rain. Moreover, his native intoxicant, indulged in only on certain religious occasions, does not do him much physical harm.

There were some ludicrous sights to behold, mingled with pathetic. Two women on the point of starting for home were seated in a wagon, both visibly under the influence of the sahuaro wine. They were conversing and weeping in their effusive feelings for each other, while a suckling infant at the breast of one of them was adding to the wail from a quite different sentiment. A thick-set, resolute woman with a nice face, an acquaintance of mine from Ánekam, took charge of her drunken husband, trying to get a start for home. The board that closes the hind part of the wagon had been taken out, as if ready for loading; she invoked the help of a sober-looking young fellow and, with their combined efforts, the heavy bulk of her husband was landed safely in the wagon. The young man next, in a most informal way, helped the corpulent lady herself to climb up by grabbing hold of one of her legs and shoving her upwards with all his might, as if she were a log.

It became necessary for me to begin my return journey to Tucson, and I proceeded first to a rancheria, which is in close proximity to Santa Rosa. I had learned that an old man who had given me valuable information at San Xavier was living here, and I desired to see him again. He turned out to be the most influential person there and was very kind. True, he accepted an unusual amount of presents in the shape of provisions, tobacco, etc., but his good-will was well worth the price. The people were encouraged by him to sell me what I wanted and there was no loss of time from having to coax and wait or having to dispel suspicions and fear. Everybody was obliging and glad to sell. Some went to the practising enclosure of the place and rifled it of anything I might desire and they all searched their houses. It was as if I had come to a primitive tribe in Australia. I secured good masks and a complete clown's outfit, the best so far, including a pouch in which tobacco and medicine plumes are carried.

At my request a man was sent to Ánekam to try to procure an old shield used in Apache fights, which was said to be in the possession of a young man who had inherited it from his father. When a Papago dies his personal effects are buried with him, with the exception of his weapons which are hung in the houses of friends or relatives until they decay. If the deceased had played some role at the great harvest festival, his mask and other sacred paraphernalia are also taken care of by his survivors. I therefore had hopes that my messenger might return with this at present priceless object. But alas! the young man to whom the shield had been entrusted, imbued with the new notions of his generation and at the same time fearing that some harm might come to him from keeping an object of so much superstitious awe, had burned it a few years ago.

Evidently the rainfall of the night before we started on our return had been heavier in the region eastward, the ground in many places being unusually boggy. Our immediate aim was Áktjin, a large rancheria south-east of Santa Rosa, and we had been instructed about the roads, which are little travelled in these parts. Unfortunately, Pablo, who had never been here before, took the wrong track, the boggy places grew more frequent, and we could proceed but slowly. At one place, evidently part of a wide arroyo, we travelled for fifty yards through muddy water, which reached even to the hubs of the wheels. The danger of being stuck fast in the mud seemed imminent, but our horses were plucky and they finally pulled us through. We congratulated ourselves on our luck and decided to take lunch then and there. For the sake of comfort, I turned up my trousers to the knees and walked about in bare feet on the wet and sticky soil. It did not seem possible that we were in a desert region. That part of the country is extensive and uninhabited; the soil is rich and it would make a splendid agricultural district. Even if there were not rains like this every year, one might build dams and sink wells. Our horses had splendid grass to eat and we had a good lunch.

It now looked as if we were to have plain sailing and, although we were on the wrong track, we hoped in some way to reach before dark a small rancheria, "Yellow Caterpillar," which was near our destination. This rancheria owes its name to the prevalence of an edible caterpillar in the neighborhood. We had not travelled long when we came abruptly upon the banks of quite a deep arroyo that had to be crossed. The mud was knee-deep and the bank on the other side unusually steep; however, there was nothing else to do but to go ahead. Full of confidence in his horses, Pablo urged them on and up the steep, short bank which they very nearly cleared; two inches more would have sufficed, but they fell back and the heavy wagon stuck in the mud up to the axles. We dug around the wheels and pushed and worked in vain; the wagon was not to be moved. Then we had to unload its manifold contents: boxes, bags, and bundles, Papago baskets of all sizes, pottery, bows and arrows, sahuaro poles, wooden ploughs, and a host of things too numerous to mention were carried to the top of the embankment. It was nearly sunset when we were again able to start. Water and grass were plentiful now, so we soon made camp among the greasewoods. After dark, coyotes approached us within twenty yards, howling as if deriding us.

In the morning my dog, Mâvit, the Papago name for mountain lion, killed a lizard and showed his satisfaction by rolling over it in joy. He also discovered a rattlesnake under a greasewood near our kitchen, but was wise enough merely to bark at it. Pablo remained long looking for his horses which had been allowed to graze at large. He had walked about eight miles before recovering them and had seen no trace of any habitation. "I wish somebody would come along to tell us the road," he said as we were having breakfast. Almost at the same moment, as if by magic, a party of three Papagoes on horseback appeared in the distance. We immediately went after them and brought two of them back to join our breakfast, one being willing to guide us to the "Yellow Caterpillar." They informed us that we were now camped on an Indian road to Silverbell. By following slightly elevated ground among the greasewoods we arrived safely at the rancheria. Here a light wagon was hired, as dilapidated a one as I ever saw, to visit Áktjin, an extensive rancheria in the neighborhood.

Two young men who were ploughing denied the possession of any masks. The next house visited happened to be theirs, and, on making the same inquiry here, the mother-in-law of one of them obligingly brought forth for our inspection a jar, the opening of which had been sealed in the usual way by a piece of pottery and mud. She broke it open and revealed to our admiring eyes a singer's and a clown's masks, which were kept inside. They belonged to the two young men. The singer's mask was just the kind I needed to complete my collection, and I hurriedly made a sketch of its decorative designs before returning it to the owners. Nothing would induce them to part with it, for they said that these things were worth a great deal to them.

Owing to several showers lately, the country in the middle of August had changed its aspect and was clothed in the opulent dress of summer, suggesting little of the desert. Leaves and grass and flowers had appeared incredibly fast. In the pools I took my baths, and around the mezquite trees, where the grass was growing thickest, the horses feasted on nature's bounty. The mezquites, the modest leguminous trees of the arid region, and the greasewoods looked beautiful in the glory of the summer. The air was permeated with the scent of the blossoms of the cat-claw, an acacia armed with more terrific spines than any other tree of these regions. The ocotillo was in leaf, yellowish-red poppies grew in the tall grass, and the ground was covered in patches with a kind of small yellow marguerites which emitted a refreshing fragrance, and among which it was a delight to place my cot at night. This is a great country for morning glories (*ipomœa*); there are at least ten species and, in the thickets along the arroyos, intensely blue flowers of this kind had entwined themselves around the bushes and seemed to cheer one on. In three or four weeks this would be all changed, the flowers turned to seed and the grass dry and gray.

In and near the fields of some of the ranches, where the soil was rich, the quelite, in Spanish *bledo* (*amaranthus Palmeri*), grew in great profusion, sometimes presenting the appearance of a large, dark, dull-green mass of vegetation. This plant, when young and tender, furnishes an excellent vegetable much relished by the Indians, but as only an insignificant part of the luxuriant growth is utilized, in his fields of agriculture it becomes the most formidable weed he has to contend with. When freshly gathered and immediately cooked, this vegetable is superior in taste to spinach, resembling more in flavor fresh asparagus. In the neighborhood of Tucson it is appreciated by Indians and Mexicans alike during its short season, though the Anglo-Saxon, in his assumed superior knowledge, has so far ignored it. Quelite, inexpensive and easy to cultivate, should be accepted by civilized households. It grows prodigiously fast and several crops may be raised in a year.

On the morning that we passed north of the Baboquivari Range, the fog climbed slowly along the sides of the mountains, after a while resting like snow-white clouds over the crests and giving them a superb aspect against the light blue sky in the pure, clear atmosphere. It was as if one had been suddenly transported to the moist, temperate zones of the earth. The arroyo west of Robles Ranch ran full of water, as a broad river in flood. Some Indians whom we met had been obliged to spend the night on the bank without being able to cross until the morning. As we passed the last branch of the newly made river which was hurrying along to disappear soon in the desert, four Mexican cowboys appeared on horseback against the sky on the embankment. They looked picturesque as they approached the water, but, on perceiving my kodak, they immediately stopped and posed for me, as if from a signal, for Mexicans are immoderately fond of being photographed. There was no interest in such a picture of men posing to look beautiful, so I put my kodak away and we continued the crossing.

My last night before reaching Tucson was spent mostly under the wagon on account of a shower. In this part of the country, where the storms of the brief wet season, July and August, come from south-east or east, the wagon should be placed for the night north and south on account of the protection its broadside affords, as the storms are fierce, especially in July, although local and limited in duration. In spite of inconveniences I had suffered from lack of a tent, the trip had been a successful one. The charm of the wilds had seized me again. No mode of life is equal to that of camping out, if one knows how, and no life so engaging as that spent in the hope of adding to human knowledge.

In Tucson I parted with Pablo who, not speaking Spanish, would be less useful in Mexico, which I prepared next to enter. He had been a pleasant and efficient companion and assistant. It is true he was careless and could never keep things in their proper places; on our trip he gradually lost most of his own belongings, his pillow, his valise, and what not, but he was always able to manage in some way. He had little or no system, for, as long as our journey lasted, he never packed and accommodated the baggage twice exactly in the

Pablo, my interpreter. A full-blooded Papago

same way. Although he lost some trifling thing of mine, he managed never to break or injure any of my belongings.

He was not an ordinary man by any means. He had, he said, read the Bible twice; the story of the creation and the prophecies interested him most, as well as Christ's sayings, which he did not think people lived up to. He was fond of historical reading, had a great liking for Longfellow's "Courtship of Miles Standish," and approved of the reports of Mr. Leupp, the Indian commissioner. He was also fond of reading newspapers and magazines. His moral ideas were of the highest order without being in the least artificial. Quick in action and punctual in keeping an engagement, he combined respect for truth with absolute honesty. Kind, hospitable, and confiding, he remained essentially Indian, but his liberal education and his fondness for reading had developed him into an independent, thinking human being. In view of the distressing, nay sickening, effect on native races all over the world from contact with the white man, often due to the missionaries themselves, it is a cheerful sign of the times that they are beginning to revise their methods of conversion.

8.

CHAPTER IX

IN MAGDALENA, MEXICO—THE STATE OF SONORA—THE YAQUI INDIANS—AN ATTACK OF DYSENTERY—TRINCHERAS, THE REMARKABLE ANCIENT FORTIFICATIONS—ANTIQUITIES OF THE PAPAGUERIA—ALTAR—CABORCA—I START WESTWARD—PLACER MINES—THE CHOYA—ITS TERRIBLE SPINES—ITS GREAT UTILITY—CATTLE WHICH ARE WITHOUT WATER FOR MONTHS

Again I found myself on the familiar ground of Mexico, passing the border by Nogales, Sonora. Ten days were first spent in exploring the country east and north of Magdalena, a mountainous region of volcanic origin, showing good copper indications, mostly in porphyry. Northward of Magdalena, for fifty miles or more, the country is less mountainous, plains intervening more and more, and finally affording long vistas in the direction of Nogales as well as of Altar in the West. The vegetation in the beginning of September was yet in its richest unfolding. Pink verbenas, violet ipomœas, and some extremely pretty star-shaped, small blue flowers growing in beds attracted attention. The grass was still green and on the plains it grew in abundance, reaching up to the horses' bellies. On an alluvial flat we rode through an extensive mass of quelite, which had assumed such dimensions that it was difficult to believe it the same plant which a month ago would have furnished a delicate morsel for our dinner. The erstwhile vegetable now consisted of thick, fibrous, or wooden stalks, with large appendages of branches and leaves, bent halfway to the ground, but even thus reaching up to the saddle and making it difficult for us to proceed. It seemed curious that there were no cattle or horses grazing in this abundance. The scarcity of wild animal life was also striking, though we saw a deer once.

Before starting on my journey of exploration westward, I first had to visit Hermosillo, the capital of the State of Sonora, in order to secure the necessary letters of recommendation from the government to the authorities in Altar. I improved the opportunity by making a tour of the important old port of Guaymas and from there continuing on the newly made railroad to Culiacan, the capital of the State of Sinaloa.

A few miles before arriving at Guaymas, the beautiful vine *antigonon leptopus*, of Mexico and Central America, made its appearance here and there, covering the bushes and small trees with a profusion of pink flowers or creeping along the ground, comparing favorably in scenic effect with the bougainvillea, though different in color. Once or twice I saw a magnificent blue creeper, entirely covering some low trees. A few straggling and withered-looking specimens of the sahuaro were observed in the neighborhood toward the south, the probable limit of the southern extension of this interesting cactus. The railroad, which will soon make connections with Guadalajara, the second largest city in the Mexican republic, will open up a country singularly rich for the pursuit of wellnigh all kinds of agriculture, and believed to contain vast resources of undeveloped mineral wealth. It will be one of the most important of the great railroad communications of Mexico. The climate is very warm and the month of September did not show much abatement of the heat. In the hotels ice is always served with the water and it is found very acceptable. However, in this comparatively dry region, which is still part of the so-called Sonora Desert, one is always reminded that the drinking water served is very likely to be neither clean nor wholesome. It ought to be boiled before drinking.

The State of Sonora is, as is well-known, the home of the Yaqui Indians and the scene of war for, more or less, one hundred and sixty years between these extraordinary able-bodied and very intelligent Indians and the masters of Mexico on the other hand. It is the old question occurring all over the world, whether the country belongs to the native of the soil or to the conqueror, and, without desiring to enter into the merits or demerits of the case in point, I should like to express my pleasure at the recent termination of hostilities which were ruinous to both sides. What soldiers can compete with men who have been known to make seventy miles a day on foot, carrying as provisions only a bag of pinole? Their campaign was an instance of the destruction that a well-directed guerilla force may cause. Mining and agriculture came to a standstill and nobody ventured outside of Hermosillo and Guaymas without an escort. The partner of the photographer of Guaymas had been killed by the Yaquis, and the photographer himself had been deprived of a large sum of money by them, so he entertained no kindly

The old way of hauling freight in Mexico, now disappearing

Bringing bat guano to Corral railroad station in the Yaqui country

Yaqui chiefs who in 1909 made peace with the Mexican Government
To the left, in lower row, Chief Bule. His two young sons at either side

feeling toward them, but he said that their valor was superb. A Mexican colonel and friend of his went to the Yaqui River with six hundred and forty soldiers. Four years later his force had been reduced to one hundred and forty, and if the authorities had not transferred them somewhere else, they would soon have had to transfer him alone, the colonel told him. Peace, honorable to both parties, had been concluded a few months before my arrival. The chiefs received military rank of varying degrees with corresponding salaries, pledging themselves in return to maintain peace and order in their respective districts.

The Yaqui, besides their own language, speak Spanish and are Roman Catholic, although they keep up many aboriginal customs and beliefs. As miners and laborers they are preferred by Americans to Caucasians or other races. They have, which for Indians is a singular gift, great mechanical ability and learn to work machines quicker than the whites. This I have on the authority of Americans themselves. When the war left Sonora without working men, Chinese and Japanese were imported, but their work was not half as well done. Even when fifty or sixty years old the hair of the Yaqui remains black and their teeth are as white as pearls.

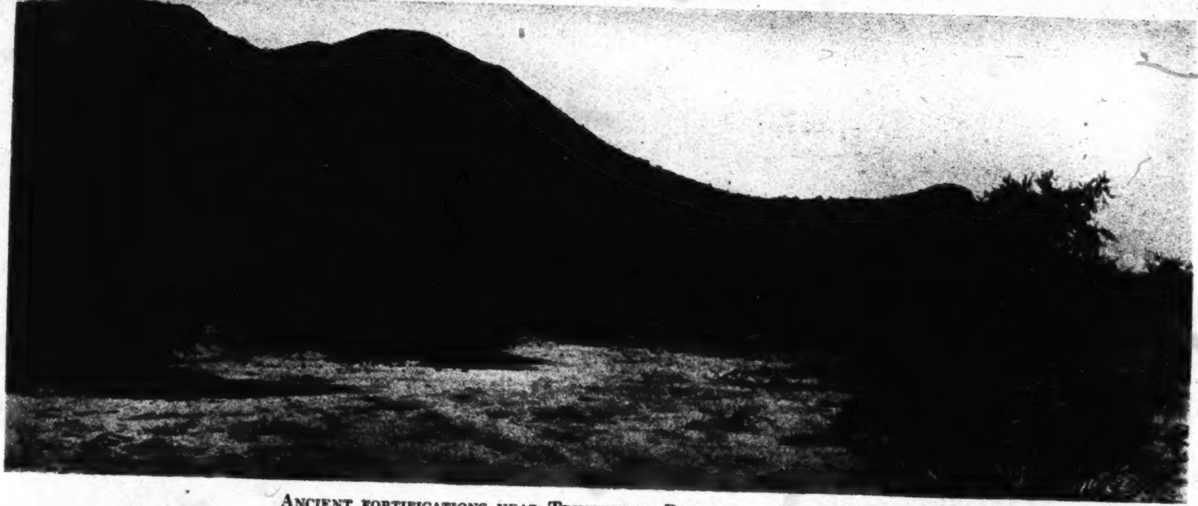
An unexpected attack of dysentery, caused by putting too much ice in my wash-tub, compelled me to shorten my stay and return to Magdalena, where I was ill for a week. It may be of interest to travellers to know that Hunyadi Janos water, two small glasses a day, was extremely beneficial in my case, and was in fact my principal remedy. Outside of my rooms on the plaza preparations were being made for the annual feast of San Francisco, the patron saint, which was to begin two weeks hence on the 8th of October. Two monstrosities of merry-go-rounds of the most prosaic American manufacture, with mechanical devices for the accompanying noise of horribly loud organs, began operations ahead of time, one of them being a few feet from my window. The one melody of which the instruments were capable—that is, if the mechanical noise could be dignified by such a name—was produced over and over again for hours, and it became a maddening, unbearable torment which decided me, though in a weak condition, to move.

With my attendant, a middle-aged Mexican from Mazatlan, I arrived safely at a cluster of houses lying on both sides of a street, seven miles from Magdalena, called San Ignacio. An impressive old church presides as usual over the village, which is remarkable as being Father Kino's second mission in Sonora, established in the year 1687. I hoped to find a room with some Mexican family here. Most of the houses had plots of ground with fruit trees and some attempts at gardening. The quiet, peaceful, atmosphere of the place was like a soothing balm to the nerves. I stopped outside the house of Prisciliano Ruiz, my former guide, to consult him as to a convenient room. He himself had a small house, consisting of a single room, which had just been vacated, and he urged me to take it. My things were moved in here and my cot put up between the small window and the door, so as to ensure plenty of air, and I felt truly thankful to be beyond hearing of the fiesta. Sitting all day in a garden where granadas, lemon and walnut trees grew, but where nature itself had done most of the gardening, I soon began to recover, the lovely air, nature's cheerful surroundings, and the unobtrusive kindness of my host and hostess making me feel better immediately. In a day or two I was able to share their *carne con caldo*, the Mexican pot au feu, which includes such delicacies as new green corn, new string beans, and squashes.

My attendant was a *cargador* (carrier) whose business may best be described as being that of moving goods which he carries on his own back. He was one of those men who can move a piano in this manner. He hailed from Mazatlan, where he used to make a good living as a dock laborer, but the life was hard, he overstrained himself, and he was now a handy man in Magdalena, of good reputation and much employed. Though slightly below medium size, when at his best he had been able to carry twenty-six arrobas (six hundred and fifty pounds). Oddly enough, during his work he used to consume a bottle of mescal a day, for, like all cargadores, he believed in stimulants; it made him stronger, he would insist. Even at the present day he was capable of carrying five hundred pounds.

After six days' stay here I felt sufficiently improved in health to return to Magdalena where arrangements had been made for a start westward on the same day with a wagon and two men. Though the fiesta was still several days off, the streets were filled with throngs of people who had come to deposit money with the image of the locally famous saint—thousands of dollars—gaining thus material benefit, besides having a good time. The saint is especially honored by the Papagoes, who gather from distant parts of their extensive region to do homage in a very substantial way. We met two large parties of Indians, men and women, riding on horseback, in their best outfits. At dusk a party of gypsies—Hungarians, as they are called in Mexico—passed us, also bound for the great fiesta of San Francisco. From the town of Santa Ana we took the road to El Tiro gold mine, which passes the village called Trincheras, which I was desirous of visiting on account of its remarkable ancient structures. For three or four hours we were crossing a large, low mesa with a predominant vegetation of palo fierro trees, the leaves of which furnish here the sole means of subsistence for herds of cattle. They grow fat on this, drinking water only every third day.

Trincheras derives its name from the "trenches," as the Mexicans call them, which cover one side of a long mountain, at the base of which the village lies on a fertile plain. There is much water under the sandy plain and a steam pump has been erected which sends it fourteen miles west to El Boludo gold mine. The ancient works which I, for convenience, shall call fortifications, run as walls along the north side of the mountain, parallel to each other and seemingly at the same distance apart though of different lengths. They presented an extraordinary sight, made more impressive by the afternoon sun, which, by its accompanying shadows, brought the



Ancient fortifications near Trincheras, District of Altar, Sonora

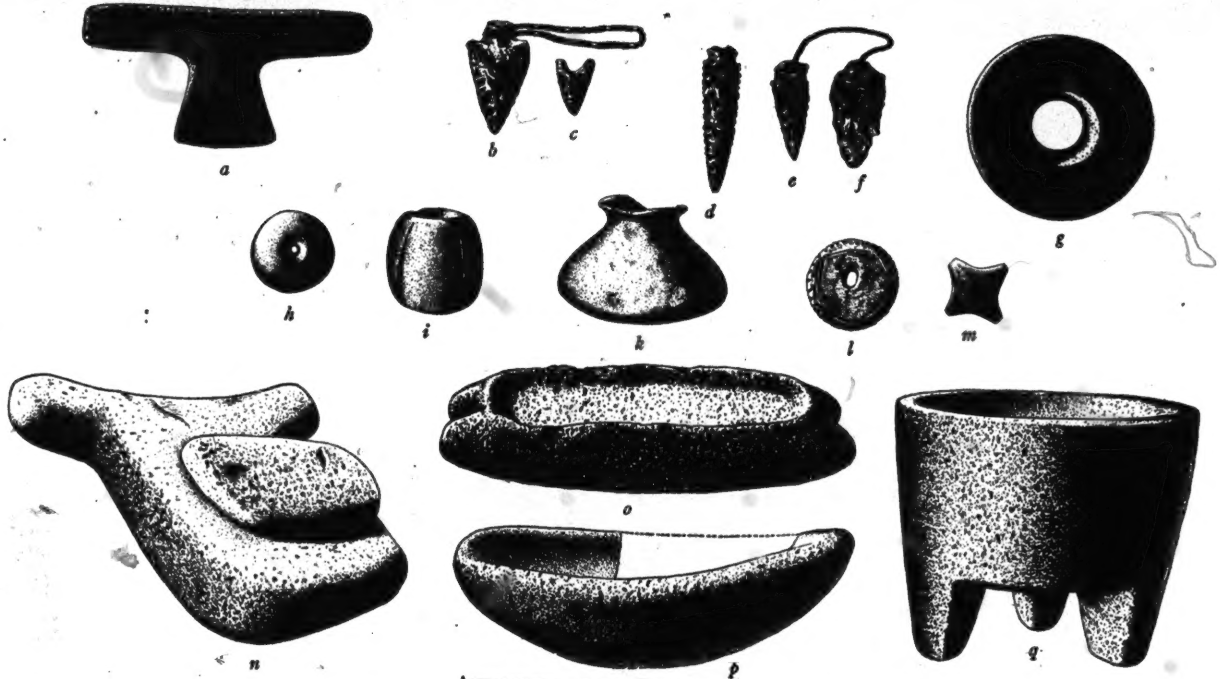
The same side of the mountains, viewed at five miles distance from the north

stone walls into strong relief. I counted twenty of them, one above the other. Roughly speaking, they occupied a height of about four hundred feet measured from base to top, some of them attaining a length of two thousand feet. After sunset hundreds of turkey vultures circled over the tops of the mountain, and finally settled down for the night on the uppermost rocks.

The mountain runs in an easterly and westerly direction and has four tops, the highest rising over five hundred feet above the plain; the western is the lowest, being hardly four hundred feet. The fortifications are found mainly in the middle region of the slope. They are somewhat narrow terraces, built of andesitic lava, their front presenting fairly well-laid walls rising to the height of a man or even higher. The four or five that are lowest down on the slope are almost on level ground, while the highest, which are very short, climb to the top; usually, however, the slopes immediately below the tops are left without fortifications. Noticeable in the long terraces at certain places is the widening out like a bastion. On the south side of the mountain there are said to be a few fortifications of a character similar to those on the north side. Mexicans told me that on the tops were small corrals or enclosures formed by upright stones in the ground, which were probably abodes of the ancient people. Broken pieces of crude pottery, metates (grinding stones), lance-heads of hard stone, and beads made from sea-shells have been found and may yet be found on the terraces. There is a report from an evidently reliable Mexican source that in digging a well in the village, pieces of broken pottery were found twenty feet below the surface, water being reached at a depth of seventeen feet.

In the Papagueria ancient fortifications of a similar kind to these are of common occurrence, especially in Sonora. On the road from Trincheras to Santa Ana they are seen on a low range called Arituaba and again in the neighborhood of Santa Ana. They are found on the road from Magdalena to Cerro Prieto, near the village of San Ignacio, near Altar and Caborca, near the Indian ranch, La Nariz, on the hill-tops near Tucson, Arizona, and at many other places. I have visited many of these, and while, as a rule, the idea of fortifications as well as habitations at the top in the shape of small enclosures of upright stones predominates, it seems as if here at Trincheras the extensive stone structures cannot be explained by having been fortifications solely, because the other side of the mountain would furnish an easy access for attack. Still less probable is it that agriculture was pursued on these narrow terraces, where people undoubtedly lived, judging from the remains left of household utensils. They here seem likely to have been of religious importance, serving at the same time as places of refuge in case of need. This is also, I understand, the opinion of Professor W. J. McGee, who first called attention to these remarkable remains. Nowhere else in northern Mexico do the trincheras compare in magnitude to those seen here. The ruins of La Quemada in the State of Zacatecas are of a different character.

It is useless to speculate as to what races built the for-



ANTIQUITIES OF THE PAPAGUERIA

a. "Scraper" of chloritic slate, from mound near Noria; length, 27 ctm. *b.* Arrow point of quartz, with attached string of beads serving as amulet, Quitovac (p. 111); length, 5.8 ctm. *c.* Obsidian arrow point, Sonoita; length, 1.7 ctm. *d.* Arrow point of jasperoid sandstone, Sonoita; length, 7.3 ctm. *e, f* (length, 5.5 ctm.). Artifacts of dolerite and jasper, Sonoita (see p. 180). *g.* Large ring of limestone, Altar; diam 17.6 ctm. *h.* Spinning whorl of clay, Altar River; diam. 4 ctm. *i.* Small pot of magnesian limestone, Kohatk; height, 6 ctm. *k.* clay vessel, Kohatk; height, 8 ctm. *l.* Spinning whorl (?) of chloritic talc, Rancho Nuevo, Altar; diam. 5.5 ctm. *m.* Polished jasper artifact, Pitiquito; diam. 3.5 ctm. *n.* Metate of calcareous sandstone, San Xavier; length, 23 ctm., greatest width, 28 ctm. *o.* Oblong vessel of volcanic tuff, Rancho Nuevo, Altar; length, 34 ctm. *p.* Metate, probably Papago, found twenty feet below surface in the channel at the head of Sonoita River; length, 44.8 ctm. *q.* Circular limestone vessel on three feet; height, 21.2 ctm.

tifications at Trincheras beyond the certainty that they were constructed by ancient people who antedated the occupation of the country by the Papago. They have left polished stone axes and nicely executed stone implements on village sites along the Altar River and even as far west as Sonoita, while in Arizona ancient artifacts may be found in the rest of the Papagueria, especially along the Santa Cruz and the Gila Rivers. Grooved stone axes are commonly encountered through this region, including Sonoita. On this point Professor W. A. Holmes informs me: "This is the most westerly occurrence of the grooved stone axe in this latitude, so far as recorded, if we except a few specimens reported from California, which, being so exceptional, may have been carried from some more easterly district."

Broken pieces of pottery are numerous on the village sites, showing no high art, though apparently equal to that of modern pueblo make. Insignificant mounds, remnants of what once were houses or villages, may be met with here and there. Pictographs on the rocks are frequently seen through the region, often being found among the fortifications, and, with perhaps a few exceptions, they owe their existence to the same prehistoric people; they are of a similar character as the decorations on the earthen-ware of the region.

Often in my travels in Mexico do I think of the valor of the early Spanish explorers and settlers—no distance too great for them, no region too inhospitable to traverse, no mountains too difficult of access! Valiant padres, escorted by soldiers or otherwise, travelled everywhere in their zeal to make converts, bringing cattle and horses and introducing new cereals and new methods of agriculture. In the field of precious metals it is astounding how comprehensive were the discoveries of the early Spanish settlers, their inborn instinct for metals being undeterred by any obstacle, and often receiving assistance from the natives. Sometimes in the wilds the traveller is surprised to meet with an old shaft sunk in a place where he was wondering perhaps whether he was not the first human being to pass.

Such thoughts occupied me as I continued my journey westward with the towns of Altar and Caborca as my first aim. In this north-western corner of Mexico, which must have appeared to the Spaniards very inhospitable on account of its scarcity of water, they discovered the great gold-bearing district around El Boludo; here are the great placer mines La Cienega and San Francisco, which the present generation has begun to work with renewed energy. Along what is called the Altar River, without running water most of the year, they found soil suitable for agriculture, and the town of Altar was founded as well as Caborca and other settlements that took the places of Papago rancherias.

At a distance Altar has a certain oriental appearance on account of many tall date palms and the Moorish style apparent in the church tower. Most of the town, consisting of two long streets of adobe houses, can be dimly discerned between clusters of trees and the many *milpas* (cultivated fields) that surround it. Along the great, dry river bed are many thriving fields, which are,

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ANTIQUITIES OF THE PAPAGUERIA

a Vessel of volcanic tuff, found in bank of San Pedro River, 30 miles from Mammoth mine; length, 25 ctm. *b*. Grooved axe of basalt, Sonoita; length, 16 ctm. *c*, *d* (length 14 ctm.). Grooved axes of diorite, Pitiquito, Altar River. *e*. Grooved axe of diorite, Sonoita. *f*. Double-edged axe of trachyte, San Xavier; length, 12 ctm. *g*. Ceremonial object, of volcanic tuff; section shows shape of perforation; San Juan ranch, Altar River; length, 10 ctm. *h*. Grooved axe of diorite, Ventana ranch, Altar River; length, 16 ctm. *i*. Grooved axe of pyroxenyte, Sonoita; length, 14.7 ctm. *k*, length, 52.5 ctm.; *l*, length, 54 ctm.; *m*, length, 68.5 ctm.: ceremonial wands of altered trachyte, diorite, and serpentine, respectively, from Rancho Nuevo, near Altar River (*k*), and Pitiquito, Altar River (*l*, *m*).

at first sight, rather surprising, but this is due to the fact that when the river, after heavy showers in the summer, is running with water for a few hours, it may be for a day, the water is diverted for irrigation. Besides, there is always water in the sand, this being more apparent further down the river at Pitiquito and Caborca, where water flows permanently for short distances and is ingeniously utilized for extensive fields of agriculture. We must also remember that we have now arrived in a region where one good shower of rain in November is enough to ensure a good crop of wheat in the following May, no rain being needed except at the time of sowing. I was shown a date palm, over ninety feet high, which was said to be one hundred and fifty years old. Woodpeckers had made nests in its trunk.

There are several wells or cisterns in the town. The climate, though very hot in the summer, is dry and extremely salubrious. No epidemic diseases thrive here. Altar is the seat of the prefect of the large district of the same name, which reaches as far west as the Colorado River, and the federal government has a mining agent here. I found an excellent *fonda* (small restaurant) opposite the post-office; a weekly paper is published, and twice a week a stage runs to Santa Ana, bringing passengers and mail as far as Caborca. There are several stores in Altar, but commerce and general business activity are less than in Caborca, situated about twenty miles further down the river, and my next stopping place.

An up-to-date flour mill is found at this latter town, owned by Mexicanized Frenchmen. Another mill is being built in the neighboring small town, Pitiquito, which is surrounded by extensive wheat-fields, and where oranges thrive in abundance. The modern part of Caborca was removed in recent times to the present situation, and is laid out ambitiously with streets as wide as those in St. Petersburg. Dr. K. Kitazawa, a Japanese physician, well spoken of by everybody, finds enough to do here and among the few scattered mines and ranches in the neighboring country. He did not know of any case of malaria here, but there was considerable tuberculosis among the Mexicans. There had been quite a number of cases of pneumonia and la grippe, which among the Papago and Yaqui Indians often develop into tuberculosis.

The church in the old part of Caborca is an unusually beautiful building, noble in its architecture. Although the old mission of Caborca did not possess as many head of cattle as that of Cocóspera, which at one time, according to J. F. Velasco, branded annually ten thousand head, still it was equally rich. Its wealth was derived from agriculture, and the bountiful crops of wheat, peas, beans, lentils, and Indian corn brought a profit by which the church was erected at a cost of sixty thousand pesos.

Formerly the Altar River passed one-half mile further east, but its strong though short-lived waters changed their course, carrying away some of the bank on which the convent attached to the church rests, as well as a part of the building. The water is at present controlled

THE CHURCH IN OLD CABORCA

ALTAR, SEEN FROM THE WEST

A RANCH, WEST OF ALTAR, SHOWING THE INDISPENSABLE WATER BARRELS

for agricultural interests, and the small stream which as a quiet brook passes back of the church represents the last of the Altar River, soon to disappear into the sand.

In this church it was that the population took refuge in 1857 to defend itself against the American filibusters under the command of Captain H. A. Crabbe who invaded the pueblo. The presidente of Caborca accompanied me up into the tower to show me the marks of the enemy's bullets. The Americans had entrenched themselves in a private dwelling opposite, maintaining probably a well-directed rifle fire. A Papago Indian saved the day for the Mexicans by ingeniously attaching fire to an arrow which he shot from the tower onto the straw roof of the American fortress, thereby succeeding in igniting it, which forced its surrender. The Americans were all shot, for times were rough in those frontier days.

The Papago Indians of Caborca number eight families who live in the suburbs, most of them making their living by working for the Mexicans. Two families still possess nice, large fields where both maize and wheat are raised and where splendid specimens of the wild fig trees (Spanish, *higuera*) were conspicuous; this fruit is gathered twice a year and eaten fresh or dried. Other fruit trees here were granadas and peach trees, as well as the ever-present nopal cactus, which is so useful to the natives, both stems and fruit being relished. There are great numbers of the giant cactus growing between here and the coast, but the fruit has not been gathered for several years. It appears that a feast at which sahuaro wine was drunk was dependent at Caborca on the killing of the mule-deer (called by the Mexicans *buro*). At the dance which was executed in a different manner from that of the ordinary sahuaro festival, the men carried arrows, and the singing was accompanied by the medicine-man's rasping sticks. The same kind of festival is probably still in use among Indians west of the Altar River.

The Indians at this place show the usual intelligence of their tribe. One young man who had been instructed in the knowledge of the alphabet by an American in Quitovac, taught himself how to read. He did not read fluently, but had almost mastered the art. Few of the Indians here can, however, be depended upon for work, as they are demoralized by the mescal brandy. They seem to employ their time between earning money and getting drunk therewith. They are no longer able to keep up their native feasts and are rapidly disappearing into the body of Mexican laborers. The same is the case with the remnants of Papagoes who live in the rest of the towns or settlements along the Altar River.

My plan had been to fit out my expedition here, but the difficulty I experienced in trying to secure riding and pack animals, not to speak of men of the right sort, decided me to continue the journey by wagon. All traffic here is by wagon, and it is easy to proceed by this mode of transportation as far as Quitovac and Sonoita, two settlements of Mexicans with considerable Indian populations in the farthest inhabitable western part of the District of Altar. Even a wagon proved difficult to procure. The *carreros* (wagon owners) all seemed to be away, though expected back.

Through the kind assistance of the Japanese doctor I secured an acceptable interpreter, a pure-blooded Papago, Clemente, and finally, through a prominent business man, a wagon was engaged, which was to be driven by its owner, Alberto Celaya, an intelligent Mexican who knew the country, having been born and raised at Quitovac. Caborca being the last place for mail, I should from now on have to depend for news of the outside world upon some obliging traveller who, going westward, might bring along my letters and newspapers. For the first days or weeks one misses sorely one's mail, especially if interested in knowing what takes place on the rest of the globe, but after a while one gets used to being without news, and on an expedition of this kind it is far the best plan to go heart and soul into what is being done; a world of one's own is created for the time being, rich in events through the conquering of obstacles, the visiting of new places full of interest and the observations to be made, besides being a source of much delight to any one who opens his heart to nature.

After so much delay I was glad to get a start. About six miles from Caborca an old mezquite tree growing on the eastern bank of an arroyo is passed. It has the mark of a cross cut into the trunk, because this tree used to be the goal of the Papago ball players of Caborca; the judges are said to have been on horseback. A few hours later our wagon, which was guaranteed to be in first-class condition and looked it, suddenly gave us a great surprise by breaking down. Clemente, the Papago interpreter, tall and long-legged, immediately started on a fast run in order to overtake an empty wagon that five minutes before had passed us rather briskly on the llano. As he ran he fired three shots from his pistol to attract the driver's attention, and after an hour or more brought the wagon back. The goods were transferred and Clemente and I made our camp near Tajitos, a small gold mine, until our driver returned from Caborca with a new wagon, which he had managed to borrow.

We passed Norias, a gold placer mine, where a small number of Mexicans and one Indian family live. The Papagoes, both father and son, had discovered mines. The father's discovery had once been thought important, and he had received four thousand dollars for it, which was spent long ago in the usual light-hearted fashion of the miner. The old man, humorous and frank, consoled himself with the fact that he owed nothing and owned a wagon. Westward of this placer mine among the hills toward Cozon are many now abandoned goldfields that yielded short-lasting but rich harvests to those engaged in "dry washing" the surface. Bonancita, San Perfecto, San Luis, and Hornitos are familiar names to the few who know the history of this part of the District of Altar.

At the Ranch Garambullo (the name of a thorny bush) are living six or seven Mexican families whose water supply is a dam which is not sufficiently large to serve beyond a limited time, when they are compelled to leave for other parts. Only one family, that of Sr. Santos

Ortega, remains all the year around, and he and his son gave intelligent information concerning conditions in the arid region. He hauled water in barrels from the well at Norias, which was mostly for household use. The cattle in that western region of the Altar district do not, as is well known, trouble much about drinking water, the juicy cacti supplying largely their needs both as regards pasture and water. Different kinds of opuntias are their favorites, both the nopal cactus, with flattened stems, and in particular the cylindrical forms which are comprised under the Mexican name *choya*. There is probably no plant in the desert that has such formidable spines as the choya blanca (*opuntia fulgida*), which is covered with so many light-colored spines that the whole plant appears whitish, and hence its name. It is dangerous to approach them, as they even pierce thick shoes, and the spiny joints seem to spring at you before they are touched. The spines have to be removed no matter how pressed for time one may be, for they are very painful and enter deeper and deeper. Cattle do not pay any attention to these terrible joints, but horses try to get rid of them by kicking or stamping violently. Dogs are much annoyed by them and bravely bite them off.

On one occasion my driver, frantically chasing one of his mules in attempts to lasso it, ran unawares against such a choya and was speared to a terrible extent. He stopped paralyzed with agony, for the joints had entered his left arm as far as the elbow; his hand was literally clutching one which was deeply embedded in his flesh, and several were clinging to his back; the slightest movement would augment the intense pain which may best be imagined by any one who has been stung by one spine alone. With sticks I removed the torturing instruments bit by bit, while he trembled from the excruciating pain. A person not accustomed to these spines and of less fortitude would have been in a dangerous condition. I bathed his hand with arnica and, strange to say, it was not swollen. The pain disappeared as soon as the spines were taken out. He then set a match to the choya, destroying in this way all its spines, and went for the mule again, but this time he was less violent in his treatment of the animal.

Incredible as it may sound, these cacti are not despised as food by cattle or by the pronghorn antelope, although the former do not resort to them in places where the other kind grows, which the Mexicans call "nude," choya pelon, on account of its fewer though scarcely less terrible spines. Its color is a darker green and it reaches sometimes a height of ten feet. This choya (*opuntia mamillata*) furnishes for at least three months of the year the staple food as well as the only drink of the cattle of that part of the District of Altar. Near the mine El Plomo may be observed the largest number of these plants, covering a space some four or five miles long and three broad. Palo verde, palo fierro, and mezquites grow alongside of the choyas and, when their leaves appear, furnish another food supply. In the stretch of country that encloses, roughly speaking, Cozon, Garambullo, and El Plomo, it would, according to Sr. Ortega, be possible to bring together from three to four

Cow eating choya

Cow showing vestiges of her favorite feeding grounds

Choya (*Opuntia mamillata*), relished as food by the cattle

hundred head of cattle that "do not drink water," to use the expression in vogue out there.

A cow making her meals from these plants is an interesting sight. The thick joint is carefully bitten off and brought into the mouth; turning the head upward, she works the sharp bit around with her tongue, chewing until after two or three minutes it slips down, and then she begins anew, evidently enjoying her meal in spite of the pain from the thorns to which she has grown accustomed. The easily detached cactus joints, which, like gigantic burrs, fasten themselves to the head and forepart of her body, are allowed to drop off by themselves after suppuration takes place in the course of four or five days. In that country the cattle are almost always thus decorated and they do not seem to suffer any inconvenience. They are in that way instrumental in disseminating this opuntia, sometimes at fifty miles' distance from the starting point, and through their digestive organs they scatter the seeds of the mezquite from one place to another.

All who live in the desert region assert that there are cattle which do not drink unless it rains. This seems to be the case in spite of the fact that many months, even half a year or more, may elapse between rains. Of this remarkable adaptation to environment on the part of domesticated animals, especially of cattle, I gained a fairly complete knowledge during the many months I spent in that arid region. In the middle of April, 1910, I again had occasion to pass Garambullo. During the preceding winter water in the dams ran short in December, and since then the cattle had not drunk water, but they were in good condition and quite fat. The daytime they would spend in the shade of the trees, but at night and early in the morning they would feed. In this manner they would maintain themselves until the next shower, which more than likely would not come before July.

Sr. Ortega, at Garambullo, is also known to have milked three or four cows without giving them water to drink, and in regard to this he gave the following interesting information: After his dam had dried up at the end of March, 1909, he gave the calves only water every three or four days. The cows, although drinking no water, yielded over one litre of milk each every morning until the middle of June. Both cheese and butter were made, and the milk from the cows that eat choya has the reputation of being very good. He assured me that, even if driven to the dam, the cows did not care to drink.

The conditions in the sand dunes near the coast are, if possible, even more remarkable. Here one or two species of plants which the scanty winter rains call into existence serve the same purpose as the choya. In this connection the beautiful *œnothera trichocalyx*, called by the Mexicans *herba salada*, should be mentioned especially; this is extraordinarily green and juicy and much relished by cattle and horses. As soon as the uncertain rains of winter have made *los médanos* (sand dunes) "green," as the Mexicans say, the cattle and horses are driven there and remain three months, from February to the end of May, absolutely without water. The cattle do not gain flesh, but sometimes die from excess of fat.

Some have been known to yield two hundred and fifty pounds of fat. Unfortunately that country cannot support large herds, but even the horses at that time suffer no inconvenience from absence of water to drink.

CHAPTER X

ADVENTURE WITH A COYOTE—UNUSUAL AFTERGLOW—A METEOR—A GREAT AND FERTILE VALLEY—THE CUSTOM OF *NIÁRI*—LA NARIZ—THE PAPAGOES OF QUITOVAC

ONE day, shortly after noon, as our wagon travelled leisurely along, we had a curious experience with a coyote, which made its appearance in the road, one hundred feet behind us. The driver was ordered to stop the wagon and my companions were asked to be *muy silenciosos*, in order to give me an opportunity with my ever-ready kodak. The coyote approached us calmly, moving around among the bushes and sizing us up. He walked across the road and, much to my astonishment, turned his paces toward us.

"Perhaps he has rabies; better kill him," said Alberto in a low voice.

"Just wait and keep quiet," I answered as the coyote came nearer and nearer among the scanty trees and bushes. He passed us within twenty feet, a thin palo verde separating us, then stopped for a moment. My terrier, which, on account of the heat, was in the habit of never paying much attention to anything during the daytime, was lying near the wagon, apparently asleep. The stranger, a beautiful specimen and in fine condition, inquisitively approached the dog within ten feet, then stopped again and looked at us. Probably the dog's white color seemed odd, it being so distinct from that of other canines of the region; perhaps he even found it difficult to classify correctly the motionless body curved up in a ball before him in the grass. He lifted up, dog-fashion, a hind leg, assuming the same defiant air that dogs do when about to meet for the first time. He over-reached himself in his boldness, however, for a slight noise against a low branch of the palo verde, as well as a waft of an unwelcome scent, aroused my dog to instant action. Quick as lightning he rose and gave chase, the coyote taking to his legs of course, but in a leisurely kind of a gallop, which soon made my dog tired of what he evidently considered a useless pursuit. I was able to get several fair pictures of the coyote while he was in the neighborhood. "How fat he was! He must have eaten many melons and watermelons in the temporales!" my men began discussing. Perhaps good living had made him careless and lazy. These animals are indeed destructive to the products of dry farming; not only are they fond of eating these fruits and the green corn, but they destroy more than they eat, biting into melons that are ripe, perhaps fifteen or twenty in a night.

In order to repair the faulty wheels of our wagon we had to call at the Campana gold mine, where the superintendent, with the usual mechanical ability of the native-born American, soon put us right. This mine is doing development work and is finding good values of ore at a depth of six hundred feet. Usually the gold mines of the Altar district are blamed for having mere surface values. According to the manager, the gold values of the district have been misjudged because the mines have not been worked deep enough.

On Tuesday, November 2, we observed an afterglow of the sun, unusual even for that land of light, air, and color. After sunset we had passed the unattractive looking and abandoned mining camp, El Tren. At dusk, as we continued our journey toward Zoñi, I noticed light reddish sunlight on the ridge, not much more than three hundred feet high, which the road follows for several miles. Less than the upper half of the range was covered by the light, the lower extension line of which was horizontal. The light, gradually fading, lasted for five minutes. When it first appeared my watch showed it to be 5.45 P. M. Even if my watch were fast, the sun must have set fifteen minutes before the phenomenon appeared. For comparison, I may mention that it was 6.27 A. M. by my watch when the sun rose next morning over the same low range.

It should be noted that even the night was lighter than we had expected; we had no difficulty in following the road, although during the last fifteen or twenty minutes it grew very dark, not, however, pitch-dark, and we arrived at Zoñi at 6.45 P. M. I found a party of Mexican engineers, as well as a young Mexican geologist, Sr. Y. S. Bonillas, camped on this more or less abandoned ranch. They all thought that my watch had the right time.

The engineers were surveying the boundary line of an immense tract of land which two enterprising young women of Kansas City, Missouri, had bought, the mining land being excepted. The territory includes a great slice of the north-western part of the District of Altar along the boundary line. Its delineation had already occupied the engineers several months. In six weeks they expected to finish their work, which would end at Hacienda de Santo Domingo near Sonoita. No doubt there are, as I later saw, large tracts of excellent agricultural land that can be made profitable by irrigation, but the speculation seems to me slightly premature.

At Rancho de Macias, on November 5, in the afternoon, a splendid meteor was observed. The engineers and the geologist had promised to dine with me that evening in return for hospitality that I had enjoyed at their hands. It was after dusk, but not quite night yet, and I was unpacking some Norwegian delicacies which were to serve as my *pièce de résistance*, when suddenly loud shouts of admiration were heard, "*Mira, mira! no mas!*" As I instinctively turned my eyes over our wagon toward the north I beheld a large resplendent orb, with a long tail, passing slowly and majestically over the heavens, roughly speaking from west to east.

The color was bluish white at the start, and the size appeared as one-sixth the size of the full moon; the unusually long tail appeared as if it might be six inches long, if seen near by. To our eyes the meteor moved so slowly that it might easily have been photographed. It grew smaller and smaller, both body and tail, the latter disappearing first, when the globe itself, now yellowish red, burst into two pieces, the smaller one going upward. Perhaps a quarter of the horizon was passed. The meteor covered fifty degrees, calculated by compass, during the time seen by me. I caught sight of it at about fifty degrees from north to west, and it disappeared in the north. When first seen it was a little lower than thirty degrees above the horizon, travelling slightly upward, then downward, and disappearing from eight to ten degrees above the horizon, which from our vantage point consisted of low hills toward the north. It was the most brilliant spectacle of its kind that I have seen. When we began dinner at seven o'clock, Venus was near the horizon, and we all agreed that the meteor had been at least the size of the complete light of Venus at that hour. Later I learned from the newspapers that the same phenomenon had been observed at Altar. At Sonoita it appeared to Sr. Isauro Quiroz as if "it disappeared twenty meters above the horizon, first sending one piece to the north-west and another to the south-east, the latter dissolving into thirty or forty red and blue sparks, and as resplendent as the sun." Sr. Bonillas, the geologist, some time before, had seen one of the same size at three o'clock in the afternoon at Nogales.

At a distance the coloring of the quite imposing mountain El Durasno as well as of the near-by Sierra de la Manteca, appears different from the rest of the mountain ranges, having a slightly light brown tinge. But Sr. Bonillas, who ascended El Durasno, found the formation to be as usual and brought back specimens of tufa and rhyolite with much crystalline grain in it. We managed to drive our wagon on a side track, which runs west of El Durasno past some temporarily abandoned ranches. Here in the first week of November, at an elevation of more than three thousand feet among sheltering hills, were several plants in bloom, and much of the grass nearest to the soil was still green. The cicadas sang during the night.

Water is found here in a small arroyo two feet below the surface. Also a water-hole had of late been opened and many birds were about. There are two large gold-bearing veins here. Some development work had been done on one two years ago, and the other one, which seemed to be less known, if at all, appeared very interesting. We camped near a deserted small ranch. At dusk four pigs that had been left to look after themselves came along, bound for the corral, inside of which they walked around several times as if preparing to camp, but they finally continued their way. I saw them moving around in circles among the bushes, apparently unable to reach a decision. Clemente thought they would most likely camp in the deserted house, for they were *mansos* (tame). Every three days the pigs go to drink; my companions calculated that their search for water would cover at least thirty miles in going and coming.

After some forty miles' travel over the gravelly, unfertile, and somewhat hilly country that began a few miles from Arivaipa, we descended gradually into the broad, flat valley that stretches for eighty miles from the neighborhood of Comaru in a west by north direction to Sonoita, continuing as far as Agua Salada. Low mountain ranges surround it toward the north, rising to somewhat higher elevations from La Nariz, westward, under the names of Sierra de la Nariz, Sierra de Santa Rosa, and the Ajo range. On the south side the most striking mountain range is Sierra de Cubabi. This great abra or valley, like the others, of recent gravel formation and rising slightly toward the base of the mountains, contains in its middle course a fine detritus of much fertility. To be sure, there is no water here except the short river of Sonoita. But both Mexicans and Indians find a profitable field for dry farming, depending solely on the few showers of the summer, and without irrigating.

The first summer rancheria we passed, which belonged to Mexicans, had all the appearances of a recent harvest of plenty, both of maize and squashes, and we bought superb watermelons here; still there was not even a dam, drinking water being hauled from Bánori, nine miles distant to the east. When the harvest is gathered, this ranch, Bajio del Alcalde, is abandoned until next summer's scanty rains bring the families back. There is a similar temporary occupation of Mexicans at Temporales, farther west, and there are three summer rancherias of Papago Indians in this fertile stretch of country. The permanent settlement at Sonoita is the most important occupation, but in an extensive valley like this only a most insignificant part of the soil has yet been utilized. Any one who has seen the marvellous changes brought about in the arid regions of the Gila River through irrigation will easily understand the unusual opportunity presented here for agriculture on a large scale. The middle of November is the customary time for the harvest, which consists mainly of maize, beans, and different melons.

FEEDING ON MEZQUITE LEAVES

PAPAGO WOMEN BRINGING IN WOOD, LA NARIZ

There should be no great difficulty in making dams, and still less in sinking artesian wells. I was told of a very convenient place for a large dam in the low range north of Temporales, near the boundary line, three or four miles away. This valley averages eight or ten miles in width; a few miles east of Sonoita low mountains draw it together, but below that settlement it widens again. Only the middle part, at a width of one or two miles, probably more at certain places, is serviceable. There may be found a few sandy patches in certain localities, but, taking it all in all, this extensive stretch of tillable soil would be well worth investigating by people interested in agricultural pursuits, and one may expect at no distant date the reclamation of what is now practically a wilderness.

At the first Indian rancheria which we passed here, we found that some of the inhabitants had just returned from a salt expedition to the Salina de San Jorge on the Gulf. There were four full loads of salt lying scattered outside of one of the houses. The salt had been placed in discarded flour sacks, two being carried inside of a packing bag of mescal fibre, which is slung over the back of the animal and constitutes a load. Coarse grass is wrapped around each sack for protection, and the bag when in use rests on two rolls of grass, which serve the Papago as pack or riding-saddle, as the case may be.

This summer rancheria as well as the next, called Represa de Enrique, is quite populous. At the latter place the Indians possess a large dam. Our arrival caused much excitement at first, due to a misapprehension, the Indians taking us to be *celadores* or mounted inspectors from the Sasabe custom-house, who at uncertain and mostly long intervals make tours along the border line. There are two hundred miles from Sasabe to the Colorado River, but the inspectors seldom or never go beyond Sonoita. The Indians seemed relieved at being correctly informed and were kind and gentle. They no doubt understand Spanish, but if spoken to would answer only in Papago. Two kinds of small wading birds were noticed at the dam and in the morning up to noon the coyotes would fearlessly come to drink. Some Mexican cowboys passing by lassoed one and then let it go again.

On the day of our departure we passed one of the fine fields which the Papagoes have here. The maize had been stored away, but two huge heaps of squashes were piled on the field; near one of them sat two women, cutting them up into long ribbons. When nearly dry these are folded up in convenient bundles and kept for winter use. There was only one small jacal in the middle of this field of plenty, and thither I directed my steps to buy some watermelons. Here also was a woman making squash ribbons, great numbers of which were hanging, festoon-like, to dry from the branches of a tree outside.

All these women came from other parts of the country and were preparing to take away as much as they wished in accordance with the ancient custom which prevails at harvest time of those who have sharing with those who are less fortunate. If a Papago is known to have been successful in his harvest, he will be visited by friends, relatives, and many others who have no claim on him other than the fact that they are Papago; they come to get *niári*, as they call it, many remaining with him for days. He is bound by custom to give presents of agricultural products to every one who comes. Some year when he has had a bad crop, he, in turn, may resort to niári.

At the locality where I found myself at present, Indians will in the season come for this purpose from as far away as Bisani and Quitovac. Nobody is refused, for the custom is binding and absolute. With the inroads of civilization and the accompanying disintegration of the tribe, many families are unable to practice agriculture at all; these and others, at harvest time, go visiting and return with their donkeys and mules laden with agricultural gifts. Also in May, when the wheat is being cut, the Papagoes gather from many parts at the places of those who have anything; they help in harvesting, but receive rewards even if they do not, according to the dictates of ancient hospitality. Among most of the Papagoes of Arizona the custom of niári has died out, though these natives are always hospitable and in some regions place food before the visitor even if the family is not eating. "To arrive at a Papago house is like coming to one's relatives," said Alberto, my driver.

The woman who was sitting outside of the hut was a widow from Quitovac and had no field. She had been visiting the houses of the rancheria for a month, helping the families a little by grinding corn on the metate, and having a delightful time meeting friends and enjoying the gifts of autumn. "When she decides to go home she will receive loads of provisions of the new year," remarked my interpreter. One of the principal men of Quitovac was making a round of calls for the same purpose. He had only a small field himself, for at Quitovac there is much competition with the Mexicans, but, as an Indian said, "he has only to sit down; all is coming to him."

On our arrival at La Nariz, Thursday, November 11, a cold, disagreeable wind from south south-west was blowing over the llano, after dark changing to westerly, whereupon it suddenly became northerly and warmer, the sky clearing of some threatening clouds in the south. In the small hours of the morning I awoke, to my surprise, from light rain falling on my tent, which lasted for half an hour. I had made friends among the Indians at the last place visited, and their compatriots here did their best to be obliging. The next day all the men gathered outside of my tent, and we had a five hours' talk on matters of interest to both sides. La Nariz is an Indian rancheria, its name being derived from a near-by mountain which, from a certain point of view, presents the profile of a human face with a well-marked nose.

There were only five families here living in rectangular houses of ocotillo poles laid horizontally and plastered with mud. I found them pleasant to deal with and anxious to preserve what there was left to them of ancient beliefs and customs. The soul of this endeavor was an elderly medicine-man, the principal man of the place. Two medicine lodges were noticed here, one of them having had to be abandoned because a Papago woman during a rainy night had slept there. According to the notions of many primitive people, she was at the time unclean, and became the cause of the building of a new lodge. At the native cemetery many makai have been interred who on feast occasions are invited to take part with the living.

The old man's son had married a woman who was reputed to be a prophet—a female makai, with whom the principal men from Quitovac and other localities at times consulted. She looked about thirty years old and had been totally blind for three years. According to her own account, she had previous to her blindness suffered for a year from violent headache and pain in the eyes. I have seen Indians made blind through small-pox, their eyes covered in a similar way with large whitish spots over the iris. In the house of this couple were held the nightly meetings that usually took place at the new medicine lodge, as the latter had been temporarily profaned by the interference of an ox that had browsed and torn the straw of which its dome-shaped roof was composed.

I proposed to my Papago interpreter, Clemente, that we should attend that evening, as nothing worse could happen to us than to be told that our presence was not desired. A brisk fire was burning as we entered, making the interior look attractive though there was no outlet for the smoke except through the door. Several mats had been spread on the earthen floor around the fire for the participants to sit upon. Two were placed for Clemente and me, on which we immediately seated ourselves, thus being able to breathe freer in the lower stratum of air. As soon as all were seated, including members of the family, the old medicine-man took the word. Without further formality he began to tell about the creation of the world by Elder Brother Íitoi and about the deluge. After having dwelt on these themes for half an hour or more, he asked my interpreter if I believed the world was created as the Papago believe, or if I entertained the belief of the Mexicans. Clemente very diplomatically answered that he had never asked me of my beliefs. The lore of the tribe arouses strange feelings even in a civilized Papago, for an Indian is nothing if not religious, and Clemente became eloquent, confessing at the start that he, having been brought up among Mexicans, knew little of his own religion. A man of position from Quitovac, on a visit to La Nariz, expressed his opinion that surely all nations have different religions and different gods, and the Papagoes were contented to have theirs, Íitoi.

Among the Indians who were serviceable here was a man of slightly darker complexion than usual, but tall and of very fine appearance, as evidenced in his name, Rainbow. His family were also nice and in his house I felt at home, changing films for my camera in the cool shade of the dwelling and even photographing the inmates. With him I visited ancient fortifications on the dark looking hill, of igneous origin, hardly four hundred feet high, which gave La Nariz its name. Where the trenches begin, about half-way up, there is a large stone as high as a man's chest; on its flat top were small artificial excavations in a row, each looking like the inside of a cup,

Pictographs near La Nariz

Pictographs near Caborca

The nose of the rock which gave La Nariz its name

only more shallow. On the rocks were pictographs of the same kind and design as may be seen elsewhere in the district, as, for instance, near Caborca. Turkey vultures have a breeding place on the top; according to my guide, who has seen the young here, these birds make no nests.

Inside of the houses of the Indians in these parts, I often noticed skins of the peccary, called in Mexico *javalin*, the meat of which is much relished by the Papagoes; also skins of the mountain-sheep, deer, and lynx were seen. The Papagoes are exceedingly fond of meat. One day at La Nariz a young steer was killed. Generous parts of the carcass were distributed to those who had helped to butcher it, and everybody in the afternoon, including ourselves, was invited to come and "eat meat." The meat was broiled on coals, each person preparing his portion for himself, and this feasting was kept up until eleven o'clock that night. The participants actually arose earlier than usual, long before sunrise, to broil more meat and continue the banquet. Nothing else was consumed, not even tortillas, and in the afternoon very little of the beast was left.

At the so-called Temporales, where Mexicans from Sonoita and Quitovac practise dry farming, besides the usual forms of Indian corn, a kind of maize that matures in about two months is cultivated. It is called *maiz de los Yumas*, is white in color, and the ears are small. I saw some that had been planted in the beginning of August and which was ripe by the middle of October. The rains rarely fall here before August. Frost usually appears the 1st or 2d of November. This year it came on November

14, and sometimes it comes as early as the middle of October. However, frost does not injure maize that has reached maturity.

Before proceeding to Sonoita, which is only twenty-three miles from here, I made a trip south to Quitovac, where I expected to find mail-matter awaiting me. There used to be some gold mining here, but the houses that make up the only street are now mostly abandoned. Two or three Mexican families live there and a small store is maintained. The main population consists of Indians, who live all around, some of them being possessors of cattle and a few having small fields. It grew dark before we arrived, and while we were arranging our camp in the quiet evening a young Indian rode up like a whirlwind as fast as his horse could gallop, stopping as suddenly as he had appeared. This is the Mexican way of "showing off" or making oneself conspicuous, and was distinctly discouraging to one who was looking for primitive people. My two kodaks were lying on the ground and miraculously escaped his horse's hoofs.

The principal attraction of Quitovac is the sufficiency of water which at all times oozes forth in various small springs at the edge of the low mesa, so-called. The latter is a deposit of calcareous matter which a quarter of a mile wide stretches behind the houses for a mile and a half in the general direction from north-west to south-east. Fossil remains have been found here, as well as at a ranch, Represa, five leagues east, where in making a dam some large animal was encountered five feet below the surface. Also at Bánori and other places "bones of giants" have

Height, 6.5 ctm.

Height, 11.4 ctm.

Ancient pottery vessels of the Papagueria. Excavated by Papago Indians near Fresnal, Arizona

been found which might bear palæontological investigation. At Quitovac Mexicans as well as Indians have dug about a dozen small ditches, the longest twenty feet, into the calcareous embankment for the purpose of giving the water freer egress. Judging from these cuts, the deposit, or mesa, rests here on fine sand at a depth of from six to eight feet only from the surface.

The Indians have a fabulous tradition that where this whitish deposit now rests there was once a square lake, in the middle of which lived a big animal that ate people. What kind of animal it was is uncertain for, as my informant, the oldest man there, said, "those who knew are dead." It was able to smell people at a great distance, and when travellers came that way they never returned to their homes, for they were eaten by it. In this emergency the Papago finally went to the cave where Íitoi lived in the Black Mountain (Pinacate) and asked him to help them. Íitoi said he would come and on the road he made ready his weapons (*váuk*), which were of hard stone, dark in color, and very large. He made four of them, and they were sharp and thin, being a kind of dagger or javelin.

"If the animal kills me, you shall see red clouds to-morrow, but if I kill the animal, you shall see white clouds," Elder Brother said as he entered the fray. The animal swallowed him, but he cut out its heart and made his way out through its flesh, and it sank to the bottom. Next day white clouds appeared around the lake, one at each corner of the world, and the people understood that the animal had been killed. Ever since the mesa has remained white, like the clouds.

The weapons mentioned in this story were probably made from obsidian which still serves as material for the making of arrow-points for ceremonial use. The obsidian is worked with a bone.

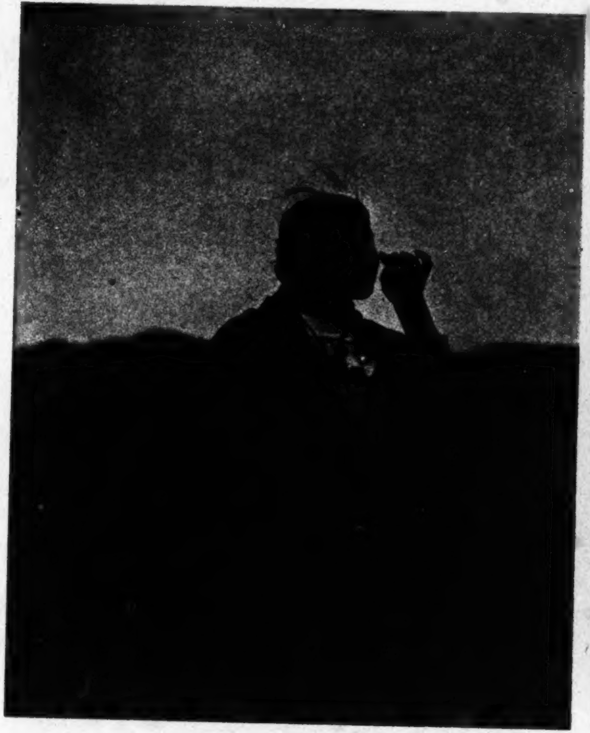
My camp was on the small plain on which the medicine lodge is situated, near an unusually well-grown mezquite tree, the shade of which is enjoyed by participants in the feasts that are given. In the evening spent here I could hear talking from the medicine lodge, but the old man, Miguel, who is in charge, complained much of the indifference of his countrymen, the younger generation never coming any more to the counsel house. The Indians here, in fact, are much spoiled by Mexicans and mescal brandy, and present to-day little of interest to the investigator. The same remark applies to the Indians of Sonoita, though in a lesser degree. A few, just a few, of the Mexicans exploit the Indians for their own purposes. It happens even that they ingratiate themselves by giving good advice—good for their own pockets—charging the confiding Indian for the advice. On the other hand, it must be said that the Papagoes of Sonora are in general treated with much more consideration than in Arizona. The Mexicans look upon them more as their equals, and the result is that the so-called civilized Indian is noticeably more polite in his manners in Sonora than in Arizona.

The great annual harvest feast for which Quitovac is famous, and to which people congregate from all parts of the Papagueria, is still kept up. It is performed in the month of August on a stretch of level ground half a mile distant from the lodge. Mexicans who have seen it describe it as a gorgeous affair. Its first object is rain, and then the preservation of good relations with Íitoi, Elder Brother and Creator. The sacred paraphernalia are afterward put away in some distant cave. The feast is already on the decline and as soon as the old man in charge at present dies, it will no doubt pass into oblivion.

CHAPTER XI

SONOITA, AN OASIS OF THE DESERT—ITS PLEASANT POPULATION —LESSONS OF THE SONOITA RIVER—ANTIQUITIES—A LUNAR RAINBOW—PRIMITIVE GOLD MINING—PREVALENCE OF HYDROPHOBIA—UNUSUAL REFRACTION OF SUNLIGHT

SONOITA is a larger place than Quitovac and of more importance. This settlement, a short day's distance from the latter, has the unique distinction of being situated on a small river, which, making its origin here, runs for a few miles south-west before disappearing in the desert. It is called the Sonoïta River and in reality originates far from there in Arizona, near Cajilon, north of the Quijotoa Range, gathering also water from the Santa Rosa valley and the west side of the Baboquivari Range. These nearly always dry watercourses unite and pass La Nariz where, after making a turn, the "river" takes a curious short course through hard rock without sand and popularly called a *barranco*, perhaps ten feet deep and less than double that wide. From there to Sonoita the casual observer would probably remain ignorant of the greater part of its course until it plunges forth from underneath an accumulation of gravelly dĕbris as a small sparkling stream, twelve feet wide and one foot deep, which produces a veritable oasis in the desert. In this stream are found two species of the small fish popularly called minnows. One, *algansea tincella*, which is six inches long, is common in the lakes about the City of Mexico and other



Papago woman, La Nariz

The principal spring at Quitovac

waters of that republic. The other, *cyprinodon macularius*, which grows only to a length of two and a half inches, is common in the waters of the desert from Nevada to Sonora.

The first white man to arrive here was the enterprising Jesuit, Father Kino, in the year 1698. A mission was, however, not established here until about fifty years later, and it lasted but a short time, as it was destroyed during the Pima revolt, 1751. The present inhabitants of Sonoita know little or nothing about this. Ruins of the small church may be observed on approaching Sonoita from the east, in the shape of two low, rather insignificant, mounds, the smaller of which lies a short distance to the north of the other. Mr. M. G. Levy, of Ajo, Arizona, conceived the idea that gold might have been stored here, which the priests in early times could easily have secured from the Indians who then knew nothing of its value. He secured permission to excavate at the site in 1907. The foundations were partly cleared, showing thick walls made from adobe. The floor was of hard, whitish earth. Besides a few skeletons, one of them with an abundance of blond hair, the only thing brought to light was a small stone disk which had three colors and which was of unknown use. An old Indian woman, who lives on the American side of the boundary line, declares that the cattle and horses which she owns have descended from those that the Papagoes took from the monks. According to Papago tradition, the Indians killed the priest or priests, burned the church and the convent, and took possession of what was of value to them, chief of which were, of course, the domestic animals. This is evidently in accordance with facts, and among the ruined walls the occurrence of coal is noticeable.

The present Mexican settlement of Sonoita dates only from the middle of the last century, about the time of the discovery of gold in California, the first settlers having come from Zoñi. There are over a hundred Mexicans all told in the oasis to-day, making an easy living by irrigating their patches of field, though little is sold, for there is no market for their products. Mineral salts, which are included in the Spanish word *salitre*, occur at certain places, giving the agriculturist some trouble; its chief constituent is evidently carbonate of soda. Nevertheless the range of food plants grown here, which includes wheat, barley, oats, potatoes, and onions, though raised on a small scale, is wide. Lima trees give excellent fruit as also do granadas, peach, and fig trees. Maize and beans yield two crops a year, and peas, peanuts, and tomatoes propagate themselves without being planted; sugar-cane, grapes, melons, and sweet potatoes do well, and dates ripen. Alfalfa is also raised. A specialty of the place is honey which is abundant and cheap; it is often used instead of sugar, and a kind of *dulce* is made from it.

A considerable number of Indians—not quite a hundred all told—who also have nice fields and water enough for irrigation, live about a mile lower down. They are contented and generally hold their own with the Mexicans. With many of the Indian children it was noticeable that the four upper front teeth were chocolate-colored, no doubt on account of the water. It appears that the coloring does not take place until the second teeth come.

Some of the Mexican children were disfigured in the same way.

On my first day spent here, toward the end of November, a pleasantly warm, gentle breeze blew from the south-west, and there was a delightful southern atmosphere, full of sunshine, peace, and contentment, about the place. I had occasion to know Sonoita well, for it became in a way my head-quarters for half a year, while making expeditions into the surrounding district and westward as far as the Colorado River. The inhabitants are kind, and theft and murder are unknown; this is largely characteristic of the entire north-western corner of Sonora, called the District of Altar. The towns of Altar and Caborca are reputed also to be remarkably free from bad men. Mexican authority in Sonoita is represented by a *comisario*, who settles any dispute that may arise. He also marries people, for there is no priest living west or south of far-away Altar.

A young comisario, recently arrived, arrested people twice for ridiculous offences; in one of them, for instance, a man would not allow his fifteen or sixteen year old daughter to marry. There is evidently little need of his activities and he probably felt that he had to do something to assert his authority. Sonoita does not boast of any prison, so any one who may be arrested has to be tied to a mezquite tree. When people are ill, they are brought to the centre of the scattered population; the patient is received in one of the houses, and the female part of the population takes turns in caring for him or her, even watching during the night. Many kinds of native remedies are used and food is prepared. On one occasion voluntary subscriptions were made to defray expenses. I was not asked to contribute, though my advice in regard to the disease was sought. It was a sad case of insanity which grew worse instead of better, so people finally lost their interest in what appeared to them a hopeless condition. On another occasion, when a poor Papago girl was in extreme distress, the house where she had been taken was for several days filled with sympathetic women solicitous for her health.

Japanese have been known, though rarely, to start from Sonoita westward through the desert, bound, probably, for the Colorado River. The people of Sonoita were enthusiastic in describing the pluck of these travellers; without blankets and with few provisions they walked better than horses, carrying water in a Standard Oil can which hung from a pole, the ends of which rested on the shoulders of two men. When asking for information about the right way, they showed much keenness in understanding the right directions.

My camp was pitched near the house of Sr. Isauro Quiroz, the most important citizen of Sonoita and a man of some reading. Both he and his family delighted in showing me hospitality and attentions; he accompanied me to the place in which I was most interested here, the beginning of the Sonoita River. Stone artifacts had been found there many feet below the surface. The river has receded of late years and brought about some changes in the landscape. Formerly there existed a series of *cienegas* (swamps) immediately above the rise of the river, extending back for about three miles. They were in reality the river itself which, during its capricious subterranean course, found itself obstructed at Sonoita and spread out into swamps. The water filtered through at one place and ran in a narrow channel which it cut through the gravelly, clayish deposit, thus forming the beginning of the river which flows on after this without embankments.

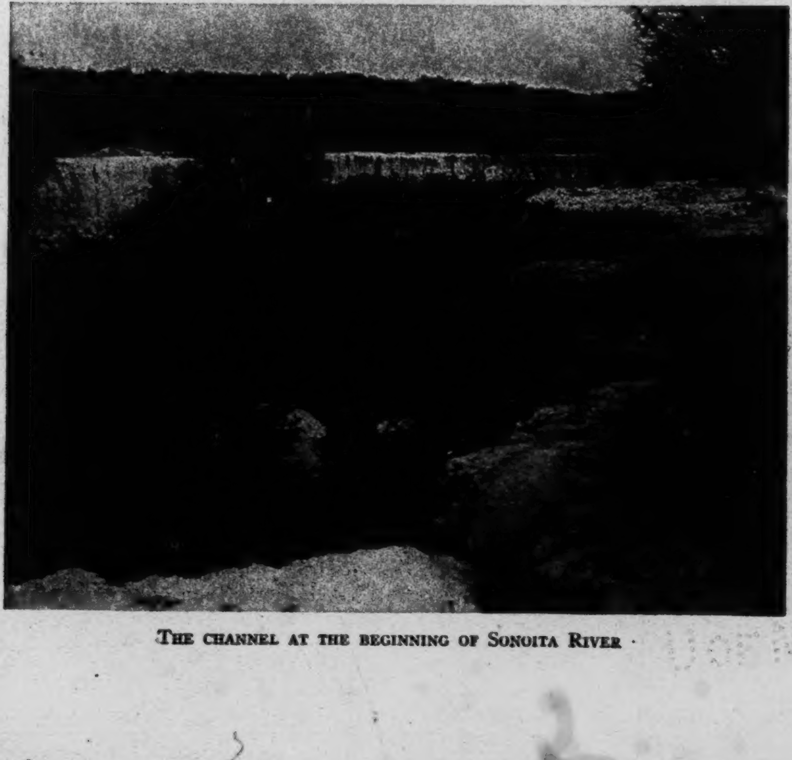
During the night of August 6, 1891, after a heavy rain, the water carried off a hard barrier, about twenty meters wide, which had been retaining the swamps, and widened the channel, making it recede about a kilometer. The swamps dried up in three years, but the surface is undermined in places and a man and his horse are said to have inadvertently fallen into a cavity caused by the former action of the water. Where there had been before only a llano, a forest of mezquite trees sprang up, which is visible to any one who enters Sonoita from the east. An interesting circumstance in the receding of the river and the widening of its channel is that it brought to light aboriginal artifacts, mostly consisting in metates (grinding stones) and their attendant rubbing stones. Also many sea-shells were found there, which were used as ornaments by the primitive people.

I found this channel to be about two hundred and fifty feet broad and from eighteen to twenty feet deep. The objects that had been discovered here could no longer be accounted for, one metate only was left and it was still lying at the bottom. According to the location of the find, as pointed out to me by Sr. Quiroz, the artifacts must have been about twenty feet below the surface. I found a metate of a light-colored stone imbedded in the embankment twelve feet below the surface, and also took along the other one that was lying at the bottom of the channel. Neither of them is quite perfect; they have been much used, but do not differ materially from those seen among the Indians of to-day. In a climate as dry as this, where rain-water has little chance, except perhaps in the month of August, of bringing about changes by removing and depositing the earth, it would seem as if thousands of years would be needed to build up a stratum of such thickness and extent, and one is led to the deduction that the climate was formerly less dry than at present.

From the Indians and Mexicans of Sonoita I gathered several ancient stone artifacts such as axes, lance and arrow points, which undoubtedly belonged to predecessors of the Papago, having the same general character as the rest of the prehistoric remains found in the Papagueria and already alluded to. The Indians of the present day know nothing about them, but the magic qualities attributed to them are used for healing purposes. To this end the lance or arrow points are left in water, which afterward is taken internally and applied externally, while the medicine-man waves the stone object over the patient, holding it by a string attached to it, and at the same time he blows his breath over the sick man repeatedly.

On Friday evening, November 26, I saw for the first time a lunar rainbow. At six o'clock we had a light shower of rain, which soon ceased. The moon, which would be full the following day, shone and the sky above

Agua Dulce, a reappearance of Sonoita River



The channel at the beginning of Sonoita River

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us was clear, but moderate winds from the south brought fine douches of rain which would often stop and then recommence, seemingly more laden with moisture each time. The south-west remained cloudy and dark, and on the western sky there appeared a large and very distinct arc, caused by the moon. It was very light in color, at first sight appearing almost white, but a more careful examination revealed colors. At its first appearance it was absolutely perfect, and I tried a quick photograph of it. It seemed to be about thirty degrees above the horizon and included one-fifth of it. During the half hour it was seen, it faded away several times, but for many moments it was very distinct, and once the northern end of the arc was quite rich in colors—even astonishingly so. The red formed the exterior ring of the rainbow. The curve was not an arc of a circle but a parabola. On account of the light showers that came and went all the time, I could not keep the camera outside, and every time I went into my tent to get it, the arc would be faint when I came out again. The Mexican engineers, whose camp I had again encountered here, had also never seen a lunar arc before. One of them, as he came riding back from the east at dusk, had observed that the moon was covered by a cloud and that as soon as it cleared away the rainbow appeared. At first he saw only the left, lower part of the arc. It appeared to him as being thirty degrees or perhaps thirty-five degrees above the horizon and having a width of one-quarter of the horizon.

I was desirous of starting on an expedition to explore the Pinacate region and the desert west of there as far as the Colorado River. The preparations, however, had to proceed slowly, because men and animals could only be procured with difficulty, and caution in the selection, especially of the men, was imperative. It became necessary for my purpose to return to Quitovac from where I made a visit to San Antonio, formerly a gold mine, said to have been discovered in 1831 by a Papago Indian. In the same year the placer mines of Quitovac were found, and at about the same time also those of Sonoita.

In the western part of the District of Altar active mining of gold, since the recent and probably temporary abandonment of the Sierra Pinta and Juarez mines, is not pursued to any great extent. As for the gold placer mines found in that part of the country, silence, with very few exceptions, reigns over them. The District of Altar is richly mineralized and there is no reason that the western part should be less so. Sixty-one years ago J. F. Velasco, who represented government authority in the gold-fields, writes: "Suffice it to say that from the River Fuerte de Montes Claros, which is the dividing line between this Department and that of Sinaloa, to the Gila River in the north, in the north-west to the Colorado River, and in the east to the Sierra Madre, there is not a town or a ranch which has not at least one vein of gold, silver, lead, or copper. Almost the same is true of the placers, although not so generally." Of the placer mines of Cieneguilla, discovered in 1779, he relates that "on the surface gold was gathered in the same way that fowls pick up corn."

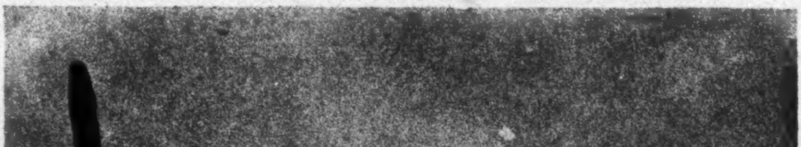
The surface merely of the different placers has been exhausted, and there is no doubt that in the district a considerable extent of country is left which will some day be scientifically exploited. The gold mines are of the bonanza type and, although the pockets are remarkably rich, I feel incompetent to give an opinion as to whether really great mines would be found there. The western desert country of Altar has been little explored by the prospector, and it would not be advisable to venture a prophecy at this time.

Almost any day primitive mining by the Papago may be observed in the vicinity of Quitovac, and it is carried on mostly by women. The auriferous gravel, which is often cemented together so as to be quite hard, is first crushed; the gold is next separated without water by the skilled manipulation of the wooden gold pan, the *batea*, the operator lifting it above his head and letting its contents fall on an extended mat or skin. Having in this way separated the coarser particles, he treats the rest in the batea as if he were operating with water. The Indians have also the ordinary "dry washing" machines which came originally from Hungary in 1851 and which may be seen in operation on those placers that are still being worked in the District of Altar.

The Papago before the advent of the Spaniard did not know the use of gold and has no name for it other than *ólo*, the native rendering of the Spanish *oro*. He is in our day, however, a keen miner and prospector whenever he chooses to go in for mining pursuits. Up to late years the Papagoes brought nuggets of gold to Tucson, Arizona, in exchange for commodities, and there is little doubt that a few of them know of hidden values, but they are reluctant to tell any outsider of such things, showing more or less the almost universal belief of Mexican Indians that if they divulge mineral secrets they will die. One Indian is reputed to know of a wonderful silver mine, and although an American married his daughter, according to rumor in order to gain knowledge of the mine, his mouth still remains as closed as that of a freemason.

In connection with the gold mining it may be of interest to note the prevalence of hydrophobia around the gold-fields of that Western country; according to all accounts, it once made considerable havoc among dogs, cattle, and donkeys, and has remained endemic in certain wild animals, as the coyote, the gray fox, and the small striped skunk. The population is now scarce and scattered, but instances of deaths from hydrophobia have been known in more recent times, though no case came under my immediate observation. Many stories are being told of how coyotes and wild foxes occasionally have bitten people or cattle. Where rabies is so common, one may be certain that a remedy has also been found, and especially in a country like Mexico with countless medicinal herbs and the strong inclination of the natives toward their use. On the Altar River, in Oquitoa, Altar, and, above all, in Pitiquito, live *curanderos*, who make a specialty of curing rabies, the secret being confined mainly to one family. In the western part of the Altar District it is the Indians who are supposed to know the secret of curing this disease, and

Salt loads, recently discharged. Papago pack-saddles in the centre.



Papago woman "dry washing" gold near Quitovac

Mexicans when bitten go to them and are, according to their own statements, cured. Having been a long time among the Papago, the secret of the Indians was confided to me, and I have reason to think that the remedy, which is extremely simple, may be of value. On some future occasion I shall make a communication on the subject in a scientific journal. Hydrophobia is called in Papago *nótakik*, derived from *nótak*, crazy, mad.

At Quitovac, on Thursday morning, December 9, sunshine was observed twenty-seven minutes before sunrise. It was accompanied by an intense glow in the east, tanager red and orange in color, enveloping the nimbus and other clouds which floated over the horizon, though leaving a clear space of ten or twelve degrees above the latter. There was a fringe of very small clouds hanging down from the large ones which resembled falling rain. Toward the west and in other directions the horizon was fairly clear, but the sky was rather overcast and I was awakened by a few drops of rain falling on my tent.

The unusual glow attracted my attention. It was then 6.25 A. M., and I found the hill-tops all in sunshine, just as if the sun were rising. The light on the summits, first rose and then white, gradually crept down on the llano and shone in my tent ten minutes later, somewhat faintly, to be sure, but absolutely distinct. It slowly disappeared except on the very tops of the low ranges. By degrees also the intense reddish light in the east grew orange and fainter, while the clear space little by little became covered with stratus clouds, except close to the horizon, above which the sun began to appear at 6.52 and then soon disappeared behind the clouds. The color was at this time very faint. The phenomenon attracted attention even among the few Mexicans living here, one of them who rose at daybreak noticing unusual colors.

CHAPTER XII

AREAS OF VEGETATION—FITTING OUT AN EXPEDITION UNDER DIFFICULTIES—AN OLD MEDICINE-MAN ENROLLED AS A MEMBER—GUADALUPE

After having secured several good animals for my intended expedition, and also engaged the services of a middle-aged useful Indian called Guadalupe, as well as his three donkeys, I returned to Sonoita. This time the whole outfit was sent on to Temporales, while I, accompanied by Guadalupe, made a slight détour to see a cave in the Sierra de Cubabi, which was said to contain pictographs. Southward from the south-east point of this sierra runs the almost invisible divide which separates the waters that run to Quitovac and Sonoita. In travelling northward from Quitovac toward this low divide it is striking to see how much higher the detritus, that runs down from the mountains in a slanting, straight surface line, is on the west side of the abra than on the east side. The cave was shallow and small and the drawings, well pecked on the inner wall, represented mainly whirlwind designs. A wagon road passes near by, following the base of the sierra; it is heavy, but shortens the distance some fifteen miles between Quitovac and Sonoita and is, therefore, preferable for those who travel with light loads.

From here we cut across the bush, to use an Australian expression, and proceeding northward direct for the Temporales, across the broad valley between Sierra de Cubabi and Sierra de Santa Rosa, here more than twelve miles wide, I was able to get an instructive idea of the distribution of vegetation. We first passed through a forest of sahuaro that thrives on the gravelly detritus along the bases of the nude sierras. Large clusters of choyas were prominent in the landscape, and became more conspicuous as we advanced, especially the very spiny kind (*opuntia fulgida*). Graceful and rounded in shape and densely covered with long white and shining spines, these extraordinary cacti presented a weird but attractive sight in the late afternoon sun. My dog experienced much trouble from the loose spiny joints that were lying about and which it was impossible for him to avoid. The formidable spines would cling to his feet and, as is the manner of dogs of that country, he would bravely set to work to bite them off, filling his bleeding mouth with the easily detached spines. We had to stop again and again to help him.

In the basins or flat depressions of the cactus region grass was growing and here is the home of the mule-deer. The useful barrel cactus was seen to have fruit, yellow in color and ripe, growing on top of the plant in two concentric circles, like small, upright bananas. These as well as the fruit of the choya, also in season now, the middle of December, are eaten by the Papago. Both kinds are first boiled; they are acid, but agreeable to the Indian palate. We followed the detritus for seven miles, descending almost imperceptibly toward the middle of the valley.

Next we passed into the greasewood region, where the mule-deer does not appear, and soon we reached the fertile alluvial plains along the more or less visible river-course of the middle valley, where mezquite and palo fierro trees may be seen here and there. As one turns and travels westward to Sonoita, there may be observed on either side the slope of detritus which presents a band of bright green coloring, due to the forest of sahuaro along the bases of the weather-worn mountain ranges. Dark green with a tinge of yellow, betraying the presence of the greasewood, is the predominant color in the rest of the valley.

The day after my return to Sonoita, December 18, the sun was hidden from view during the entire day. It had quite a depressing effect; the weather was cold and gloomy, and in the night the thermometer registered 19° F., the lowest temperature that I had as yet recorded. During the winter in this region there are many cloudy days, though usually the sun comes out warm and pleasant in the afternoon. Light snowfalls on the tops of the higher mountain ranges were afterward reported; according to trustworthy authority, in 1899 the snow was even four or five inches deep.

The essential part of my outfit, including certain provisions, had already been provided for in the United States and Hermosillo, but as I always depend largely upon the products of the country in which I travel, there were many things needed before I could start from Sonoita. It is not a good place for fitting out an expedition; one cannot even depend upon getting barrels in which to carry water on the trip. Provisions are scarce, except honey and that at times gives out; beef, so indispensable a part of the Mexican diet, may occasionally be bought, and usually excellent lard of native manufacture may be procured, for among Mexicans a hog is killed only for the sake of the lard to be obtained from it. Two of the antiquated mills operated by donkeys were set in motion to supply us with flour, the most necessary part of all provisions, and later on I was thankful that the ordinary white flour was not procurable.

To be sure it took a couple of days or more for the patient burros to turn out a quantity large enough with which to make a start, but waiting for this flour was worth while; though the Mexicans sift out the chaff, they naturally do not succeed in separating more than half of it by their primitive methods, and the freshly ground flour, slightly brownish in color, baked into the Mexican tortillas has a flavor that defies description. The flour that the Indian woman grinds on her metate, the whole wheat, shell and all, ground as fine as it is possible for her to do it, is still better. If she is willing to make this into tortillas and toast them, the traveller will have the most delicious bread he has ever tasted. I have become a convert to the tortilla, provided it is not served in a soft state as is usually the case; even those made from the white man's flour, as thin and large as a medium-sized newspaper, are good when afterward toasted on the coals as they should be, without any burnt or brown spots. In the making of dishes *au naturel*, Indian and Mexican women have no peers.

The side and bottom of a Standard Oil can was straightened out to serve as our baking tray. At one end a hole was made and a loop of wire attached by which this extremely useful contrivance could hang from any convenient place in the packing outfit. The ordinary *comal*, made of earthen-ware, is of course useless for travel, and a so-called Dutch oven is altogether too heavy and cumbersome, besides being of little use. I was so pleased with this extemporized utensil that I had another made, and both served well for many months, providing us with the luxury of freshly made, crisp tortillas.

A fairly large supply of preserved goods of the kind used by travellers had in due time arrived. In that dry, warm climate, California canned fruit of the best brand furnishes a rich and useful relish. On an expedition like this, where the distances between water are great, the outfit should be movable and convenient, and heavy things are to be avoided. Bacon is a necessary adjunct for the preparation of game to be killed and for other reasons, and dried vegetables of various kinds must not be omitted. Small packages of pressed figs, dates, or other fruit, sold at five cents each in New York, as also shelled nuts, were found extremely useful to take along in the saddle pouch when obliged to travel without stopping to prepare food. Wood for making fires is often scarce, especially on the coast, but does not need to be provided in advance.

As for the animals to be used on the expedition, I had gradually been able to acquire the necessary supply of mules and horses. The Indians were persuaded to leave their comfortable huts in those chilly, windy days to look for their burros (donkeys) which were running on pasture in the surrounding wilds and some of these were bought. The Mexicans who were to accompany me furnished their own horses. Great difficulty was experienced in regard to pack-saddles, and a quantity of burlap had to be bought to supply the need of saddle-cloths, especially for the burros, and, because it was not possible to secure material enough for this purpose, Sr. Quiroz and I contributed some old clothes which answered very well.

Pinacate, an extensive field of volcanic upheaval, to the south-west of Sonoita was the immediate object of our journey, and Alberto was to bring his wagon that far in order to furnish transportation for a Papago medicine-man called Quelêle (carrion hawk), who was too old to ride on horseback. As he was born among the sand dunes and knew well the Pinacate region, which plays an important part in the tribe's traditions, I was glad of the associations that his presence with us would bring. It was a difficult matter, however, to induce the old man to participate in the venture, although on my first visit to Sonoita he had consented to show me Elder Brother's house, as he expressed it; in Pinacate is found one of the principal residences of this deity, a sacred cave to which the younger generation of the tribe pays little or no attention. In spite of his having left Pinacate many years ago, and associating much with Mexicans, he was a firm believer in the ancient regime, and to him it was a fact that their Creator lived there.

When I saw the old man again, on my second visit to Sonoita, he had thought my proposition over thoroughly and he feared to go with us; the Mexicans who accompanied me might afterward show the cave to others, or Mexicans might follow our tracks later and take away the things sacrificed there. Some evil might befall us such as an illness, or a strong wind might carry us down into the abysses; then a prospector had once availed himself of his services without paying him. Having been reassured upon all these points, he finally said that on one condition only would he go with me, namely, that on arriving we should spend one night in singing. This was readily agreed to; Clemente, my interpreter, knew how to sing several Indian songs, and I also knew two, and in addition in my camp there was Guadalupe, the Papago, who sang very well.

He then declared it necessary to bring certain sacrificial offerings to deposit in the cave, which it was incumbent upon me to procure. The articles could be bought from the Indians of Sonoita, except blue glass beads, which were acquired through the kindness of his wife. She sold us a piece of a beautiful large necklace which she wore when she went to the annual feast of Quitovac.

One difficulty more had to be overcome, the planting of his wheat, for which he desired two days, I paying a man to do the work. When I rode back to my camp late in the evening I felt that I had accomplished something toward the success of my coming expedition; but still I could not be absolutely sure of him until I had him in the wagon, and it was pleasing to me two days later to receive his assurance that he was now ready for the journey, "if the sun was shining." For a man nearly eighty, even though an Indian, it was not an unreasonable demand, as the weather was surprisingly chilly and so damp that it interfered with the packing of my boxes. On Friday, December 24, the ground was as wet as if it had been raining; light mist rested on the hills around, and the sun arose in fog which completely enveloped our camp, frost appearing on the ground, but the following day, Christmas, the temperature changed and the flies stung as if we had been in the wet season.

"It is the mile that begins at the door of one's house that is the most difficult of the journey to accomplish," says a Norwegian proverb, and the truth of it was certainly brought home to me as I made resolute struggles during the day to start with Mexicans and Indians who yet did not know each other or the sundry animals, burros, mules, and horses they were packing. To complicate matters, Guadalupe, the Papago, got drunk; I decided to move at any cost, and he managed to sit on his burro, though swaying to and fro. Knowing how valuable he would become away from the alluring and demoralizing influence of mescal, I was patient with him. We did not travel farther than to the Indian village where we made camp on the dancing place of the Indians in front of Quelêle's house. The pleasant little plain was on a slight elevation, faultlessly level and scrupulously clean. Under the jacal that furnishes shade for the principal performers during the ceremonies of the feast, my men spread out their beds. The night was clear and beautiful, the air fresh, and I felt satisfaction in having overcome such trying circumstances and in the fact that I was actually on my way. My party consisted of three Mexicans and three Indians; a Mexican who was to act as guide from Pinacate to the Colorado River was to join us three weeks later at Pinacate.

Guadalupe suffered much that night under the reaction from the awful stuff sold as mescal and in reality wood alcohol and water. But with all his deplorable failing as regards strong drink, he was much of a man, and the next morning found him as active at his work as any one else. From now on he was for many months my valued companion in the desert. He was an excellent packer, besides being a good cook; what he knew he had picked up from the Mexicans, but he was more conscientious and careful than most of them. He knew what to do and did it without orders; a renowned tracker, he was also fond of shooting, spoke Spanish besides Papago, and was faithful, courteous, and quiet, and altogether an ideal man to camp with. Still this same man, when he came into Sonoita or Quitovac, where the white man's fire-water could be procured, would drink like a fish, selling his animals and belongings to gratify his craving. Only his marvellous constitution kept him alive, many Indians having been known to die from the dreadful alcohol sold them.

CHAPTER XIII

THE OLD CABORCA-YUMA TRAIL—QUITOVAQUITA, THE PLACE OF SMALL SPRINGS—OLD CAMPING PLACES—PINACATE AND LEGENDS CONNECTED WITH IT—DISCOVERY OF WATER—OUR FIRST MOUNTAIN-SHEEP—VISIT TO A SACRED CAVE—ASCENT OF THE PEAK—WINTER WEATHER—CRATER ELEGANTE—TRAVEL AT NIGHT

QUELÉLE, the old Indian, joined us in the morning as we started on our journey westward. From Sonoita to Agua Dulce, a day's journey, we were on the old trail which, passing Sonoita, connects Caborca with Yuma. It follows at first more or less closely the Sonoita River which, after an eight-mile course, ceases to exist except as a dry river-bed with a growth of mezquites at either side and streams of running water appearing at intervals, the last time at Agua Dulce. This old *camino real* was the only means of communication between Sonora and California in the days before the Southern Pacific Railroad was built. As the country traversed is fairly level, the track is passable for wagons. After leaving Sonoita the great difficulty was, of course, water; the custom of carrying this in barrels is of late date, the travellers, mostly Mexicans, using gourds (*bules*) for the purpose, which is very precarious on account of their limited capacity and fragility. Certain of the camps of the trail, such as Agua Dulce, Tinaja del Tule and Tinajas Altas, are renowned in the pioneer history of the district. Here water usually could be depended upon, being stored after showers in natural cavities of the rock, but between Sonoita River and Yuma there is no running water for one hundred and thirty-five miles; when the pool at Tule gave out, there would be sixty miles to cover without water. But for the help of the Papago Indians, who knew where water was, it would have been impossible in those days to have established the trail, in the following of which, moreover, hundreds of people later died from thirst. Many recent authorities speak of this part of the trail as the *Camino del Diablo*, but nobody in Sonoita knows it under that name, and possibly there may be some confusion arising from the name of the small cañon between low ranges which the trail passes near the Tule well, called *Cajon del Diablo*.

The Jesuit fathers were probably the first white men to pass over the trail in the seventeenth century, and Father Kino has left us a map of it. There is no evidence to show that they ever traversed the country south of it, at least west of Sonoita. Bancroft's map of Melchior Diaz's supposed route is absurd to one who knows the region in question. Among Mexicans there is a persistent rumor of an abandoned mission somewhere in the sand-dune country east of the Colorado River, showing foundations of walls near a spring with running water among the sand dunes, and an old smelter connected with it. Its location usually is placed near the coast south of Tinajas Altas. A man from that camp, who was looking for his horses, is said to have come across these ruins near the Cabeza

Prieta Range, but the lower part of the Sonoita River is assumed to be the locality by others. A Mexican from Yuma, according to report, searched for it with perseverance for several winters. Although I travelled for many months in those regions, I saw or heard nothing to substantiate a belief in the lost mission with its supposed treasures buried by the crafty monks.

I made a halt of one day at Quitovaquita, a small Indian settlement just within the United States boundary, in order to try to procure as member of my party a Papago medicine-man who lives here. He is known under different names, as Cara Colorada (Red Face, a translation of his native name), El Doctor Pancho, or simply Pancho, and enjoys considerable reputation in his profession. He is one of the few surviving sand people (*areneños*) who once inhabited the dune country over which my explorations would lead. It was especially desirable to have him as guide through that somewhat difficult region from the mouth of the Colorado River eastward along the upper part of the Gulf of California, and no Mexican had been found who knew that country.

Quitovaquita owes its native name, "Small Springs," to several diminutive springs with excellent water which are found there, and which in futile attempts at cattle raising and mining have been deflected into a dam, now utilized solely by Indians. The tiny stream, fed by the springs, carries beautiful, limpid water amid banks white with mineral salts; the fresh green weeds at the bottom are also refreshing to behold. When heavy showers fall, connection is made with the Sonoita River, and the same minnows which were seen there were splashing in the streamlet up to its very sources. The dam, of only moderate size, made a charming impression with the surrounding trees and bushes here and there reflected in it. There were a few dark gray and black water hens here, one white heron and some ducks, and at dusk seven fine-looking geese swooped down into the pond, evidently intending to spend the night there.

It was very disappointing to have the old medicine-man prevented from joining us on account of the protracted illness of his daughter, who needed his care and presence. I interviewed him, however, as long as his patience would permit, and although his knowledge and horizon were limited, he gave accurate information and was sincere in his beliefs. He was also willing to sell me eagle plumes which I needed for my visit to the sacred cave in Pinacate, bringing me for selection a number of large wing feathers as well as some small ones from underneath the wing. Our own medicine-man, who had to be consulted on this question, said that the small ones would do very well. One dollar as the price of four tiny feathers, though they came from an eagle, and had to the Papago much religious value, seemed rather excessive, but I paid it on learning that four of the big ones were worth a horse, or sixteen dollars.

The old camping place, Agua Dulce, which we passed the following day, has abundant and good water always flowing, for a short distance, in the Sonoita river-bed. There used to be a Mexican ranch here which has been abandoned, the surrounding country being entirely given up to wild donkeys, which thrive here, and in the dry season make such a noise at night as to prevent any possibility of sleep. Their headquarters are at this pleasant little stream, and between here and Quitovac there must be about three thousand of these animals which are constantly multiplying. They are very fat and attempts have been made to manufacture soap from their fat, an article which is always expensive in Mexico. I was informed that the late Cipriano Ortega, who established the now deserted Hacienda de Santo Domingo, once shot one hundred of these burros which supplied soap to the value of two thousand dollars Mexican currency. Some of them yielded one hundred and twenty-five pounds of fat, and others only fifty. There are many wild burros also in the District of Magdalena. The printer in Altar told me that donkey fat is the best for typographical use.

At Agua Dulce we left the old Yuma trail, proceeding now in the direction of Pinacate, first to Agua Salada, five miles farther, and then to Los Pozitos. At both localities water may be found by digging in the river-bed, though the mineral salts, comprised by the Mexicans in the word *salitre*, often cover its banks like a thin layer of snow. We camped a little beyond, not far from a sand dune branch that extends from the coast as far as Agua Salada. The water at Los Pozitos, though abundant and found wherever one digs in the sand, is somewhat brackish and slightly muddy.

APPROACHING STORM. VIEW FROM PINACATE TOP, LOOKING SOUTH, AT SUNSET, JANUARY 3

PINACATE FROM THE EAST. COMMENCEMENT OF THE LAVA FLOW. TO THE RIGHT, MY CAMP

BELT OF GREAT SAND-HILLS SOUTH OF PINACATE
Photographed at seven miles distance from the north

NOL [illegible]

The animals declined to drink and its taste was not pleasant, but our experience in the desert along the coast later taught us to look upon this kind of water supply as almost nectar. In the evening, which was December 28, we had light breezes from the south-west, then from the east and finally from the north, during a period of two hours, the weather changing from clear to cloudy and back again two or three times. Hardly did I take a note of the weather before there was a change.

A horse that strayed away during the night delayed our departure until about eleven o'clock. We soon emerged from the small hills that surrounded our camp and entered a fine llano with an inspiring view of the volcanic upheaval called Pinacate toward the south-west. Very noticeable are the two cone-shaped peaks, Los Picos del Pinacate, which rise from the central part. They are visible at a great distance, and from our point of view appeared to be side by side, the one to the left being the nearer and slightly lower. The vast llano, covered with sombre yellowish-green greasewood bushes sparsely interspersed with chamiso, appeared as flat as a billiard table. Greasewoods formed the horizon toward the south-east between Sierra del Pozo on the left hand and Sierra de San Francisco on the right. The soil looked surprisingly rich, and the Mexicans all agreed that it would be good for agriculture.

The Papago name for Pinacate is Tjuktóak, "Black (*tjuk*) Mountain (*tóak*)." The Mexican name is derived from the prevalence here of a large black beetle called *pinacate*, some species of *eleodes*, which raise the hinder parts of their bodies in a peculiar manner when interfered with. The locality is famous in the legends of the Papago as being the mountain where Íitoi, or Elder Brother, landed after the deluge. He knew, so tradition goes, that the world was going to be flooded, and he saved himself in a cask made from greasewood "gum" with a cover of the same material. He also taught the coyote how to save himself in a reed. He advised the pinacate to go down into the ground and the vulture to rise high up in the sky. Elder Brother saw how water came forth from the tops of the mountains, and when it was rising he entered his cask which floated four times around the world, and then he landed at Pinacate and was very thin after the long voyage. The coyote also drifted four times around the world, and was the next to effect a landing, on a range without passes, near the Gila River. The ground was wet and very muddy, so Íitoi put up four ceremonial sticks to drain the country. He and the coyote met the pinacate and they all walked together. The ground was so wet that they could not sit down, so they dug a hole deep down, where they found the soil to be less moist. Then they created the red ants which a little deeper down found dry earth which they brought to the surface for the three to sit on. From the presence of this deluge legend among the natives of the arid country, one might, not without reason, deduce an argument for a change of climate since the days when the legend originated.

Another legend of Pinacate refers to one of the volcanic eruptions:

Iitoi lived in Baboquivari before he came to Pinacate. At that time there were many people in Pinacate. The mountains were very high then, and the sun used to set soon after it had risen, so the days were very short. He saw that this did not suit the people, and he decided to lower the mountains. He built two fires, where the two peaks are found to-day, making fire by drilling one stick into another one. The wind blew the ashes about to all parts and made the mountains lower, covering the country so as to look as seen to-day. After that the people lived contented, and there was not so much shade from the west.

We approached the great dark looking mass of extinct volcanoes much sooner than I had expected. Small isolated volcanoes were observed on the plain below and near the main mass toward the north-west; one which was soon left behind is light in color, almost pinkish, hence its name Cerro Colorado, with deep furrows from the top down and with an air of recent formation about it. Our old guide, though he had left the Pinacate region forty odd years ago, pointed out with no uncertainty the place where the Indian trail ran that would take us to the cave. At a considerable distance away there is visible about half-way up the mountain side an abrupt declivity of a descending ridge, looking something like a landslide. Below that declivity he said that water would be found, and here our camp was to be. As soon as we arrived at the lava flow the track was very hard to follow. Sometimes we crossed small arroyos among the low ridges with a vegetation consisting mainly of palo verde, palo fierro, and coarse grass. The wagon could only proceed with difficulty, and finally at dusk we made camp near an arroyo where there was plenty of good grass for our animals, but no water.

The next day we set out to search for water, following the crooked dry water-courses that ran down from the mountains. As we ascended I enjoyed the fine view toward the north-east, though the weather was hazy. It must have rained more here than from where we came, for we found several of the small arroyos slightly moist and I observed half a dozen different specimens of flowers in bloom. After a few miles of ascent, the presence of small birds singing indicated water somewhere; it was found below the peculiar declivity of the mountain slope, just as we had been told, but its appearance was altogether surprising: four natural dams filled with water, rising one above the other in the narrow gorge. The largest was fairly accessible to our animals, but the rest could not be reached by them. Some of the lava in the neighborhood had quite a recent look, like cow dung or iron slag in appearance.

This locality used to be one of the favorite haunts of the sand people. Pieces of broken pottery were strewn on the ground and small circular rows of medium-sized stones indicated the camping space of each family. Here they came to hunt mountain-sheep and to gather the edible seeds called chia (*hyptis*) which, when placed in water, half dissolve into starchy matter and are much relished. The Papago call the locality "Many Pools," and I named it Las Tinajas de Emilia for my friend, Miss Emily Beebe, of Boston. In a country where water is so rare, travellers hail with delight the sight of such picturesque reservoirs. From here a trail leads across the mountains west of the two high peaks to another former important Papago camp, known among the Mexicans as Tinaja de los Chivos. At both places the water lasts usually more than a year, a longer time than at any of the other natural tanks in the Pinacate region, the high rocks which surround them preventing much evaporation.

The next day, leaving our wagon behind, we moved up to our new camp, the site for which I selected in an arroyo three hundred yards below the newly discovered tinajas. Though somewhat limited in width, the dry watercourse with its gravelly sand furnished us an attractive camp on a small elevation in its bed. As was usually the case with these sheltered arroyos among the lava flows of Pinacate, there were several species of bushes in flower, such as the salvia with its odorous leaves and another, called by the Mexicans *pinta pan*, which had bright, light-blue flowers. It was the last day of the year, though the temperature suggested spring. The slender ocotillos on the small gravelly mesa near by were beginning to bring forth new leaves, and in the evening the voices of the cicada (*la chicharra*), to my ear so closely associated with tropical summers, mingled with that of the mocking-bird. The balmy air and the peace and calm of the place were delightful.

But the very next day, Saturday, January 1, and for many days following, we were made aware of the presence of winter. A moderate gale sprang up from the south, gradually turning damp and disagreeably cold, and the sky became cloudy with occasional light showers. Two of the Mexicans went out to look for *carne* (meat), which was sadly needed where so many people, all with ravenous appetites, were assembled. My principal hunter, whom we called Charlie because, though a Mexican, he hailed from Arizona, had been promising us mountain-sheep for two days. "At this time of the year," he said, "the sheep are on the tops of the mountains, where the females are having their young." But scaling the tops brought him no reward and he did not find even one fresh track, so his compatriots began to make merry with him.

About the middle of the day, however, our attention was suddenly attracted by the repeated sounds of rifle shots from above in the mountains. After a while our hunter appeared on top of a sloping ridge above the camp and shouted for a burro to carry the quarry to camp, a message which gave us all much satisfaction. It was a fine, large ram which the combined efforts of three Mexicans lifted up on the pack animal. In camp it was hoisted by the hind legs to a branch and carefully skinned and opened. In the stomach were found the flowerstalks as well as leaves of the white brittle bush, an herb called *golondrina* (*euphorbia polycarpa*), reddish in color and blooming at that time, also some of the parasitic plant that grows on the palo verde and palo fierro. Another and smaller mountain-sheep was brought in and an essential part of our provisions was successfully settled for some little time to come.

Queléle had put in readiness all the sacrificial objects we had brought along for our proposed visit to the sacred cave, and he had made several improvements in the arrangement of some. As the time drew near for our excursion, I felt little inclined for the vigil of one night which had been agreed to, so I asked him if a couple of hours' devotional exercise might not be sufficient for our needs. Clemente and Guadalupe, though perfectly willing to comply with the conditions, confessed that they did not know any Pinacate songs. By this and similar arguments we succeeded in changing the old man's mind, and he delighted me when after thoughtful reflection he declared that it was not necessary to sing now that we had so many sacrificial things.

I had decided to take Monday, January 3, for the visit, combining with it an ascent of the one of the two peaks which was nearer to our camp. In the morning the wind changed to west and north-west; a chilly, light shower of rain fell, but when we started from the tinajas for the ascent at 10.40, the weather was clear, there being only a few nimbus clouds in sight. As we followed the fairly distinct Indian trail that winds its way along the ridges upward, I observed the chuparosa (*beloperone californica*), the flowers of which are eaten by the Papago, and also quantities of the well-known plant chia in the small arroyos and declivities. One hour's march brought us to the base of the cinder-covered cone where the cave was situated. Many years had gone by from the time of Quelêle's last visit to the sacred precinct; his hair was not gray then and more than one generation had passed since. He could not at once find the object of our trip and half an hour was spent in searching for it in the lava flow.

There was an entrance to a subterranean cave which he distinctly remembered not to be the right one, and here we noticed some marks cut in a sahuaro which was growing near the hole that led downward. Our cave turned out to be a long natural tunnel, the bottom of which ran for some twenty feet below the surface. The roof of the tunnel had fallen in for about ten yards just where the entrance to the holy place had been, and hence our guide did not at first recognize it. The passage is believed by the Indians to run westward underneath the mountains, then under the sea until it reaches an island where Elder Brother's wife lives. The god has another though less important "house" some miles from this cave on the same side of the mountain, but this I did not visit.

It evidently filled Quelële with dismay that "Íitoi's house had fallen down." The god himself had caused this destruction in anger against the people who no longer came to deposit offerings and do him homage. Some old, weather-worn sacrificial objects were observed around a small natural terrace down in the opening, as well as in the cracks of the rocky sides. Our guide was too old to descend himself, but he asked the two Indians, Guadalupe and Clemente, to perform the sacrifice for him. They clambered down and Guadalupe deposited in a crack of the old lava the ceremonial objects we had brought along. These objects were an arrow, as a mark of respect and for the use of the god; a prayer-stick, colored by red ochre with a small eagle plume tied to its top, to secure luck in hunting; a bunch of yucca fibre tied in a knot, in order that the wind might

GUADALUPE AT THE SACRED CAVE OF PINACATE

[illegible]

be favorable to us; some cigarettes for the god's personal use; a piece of blue glass bead necklace, for the god to use as appendages for his ears and for the septum of his nose. On their own account Guadalupe and Clemente each placed a strand of fibre in order that nothing untoward should happen to either of them while on the expedition, asking especially for protection against storms.

While this was being done the old man lighted a cigarette and, turning his face toward the west where the sea is, though hidden from view by the peak that rose above us, he made his prayer aloud to Íitoi, smoking now and then and blowing the smoke in the same direction.

"I did not come to visit you because the weather was bad," he said. "Now I have come to leave these things here. I could not find your house because it is so different now. With whom are you angry? Perhaps you are angry with us because we do not visit you more often. A man comes here from the other side of the sea to know your house. I bring him and his companions from Sonoita. Give good luck to the man and to us all. Give good luck to the hunters that he has with him. Give them a mountain-sheep that you do not need for yourself. Give me good luck on my return home. Don't let it rain while I travel. Stop the wind."

The ceremonies over, he began to make his way back to camp while we continued our ascent at one o'clock in the afternoon. Near the rim of a small crater, two-thirds up from here, quails and a cotton-tail enlivened the scene. I had expected to be troubled by spiny choyas when walking in the slippery cinders, but there were none growing toward the top; in fact, I hardly observed half a dozen the whole day. As we approached the top the paths of the mountain-sheep were very noticeable in the loose cinders, as distinct as if a dozen men had been marching in file, and leading upward in fairly good grades. The roads became more numerous as we ascended, and often we saw the lairs of the sheep where their bodies had left shallow hollows in the cinders, there being perhaps half a dozen or more at each place. These animals seem to select the most lofty places for camping although they may never be disturbed by human beings; even at the very top, toward the east, their camps were seen, and one at only ten yards from the summit. Our ascent ended at 2.40 P. M. My aneroids, subject to the uncertainty inherent in all those instruments, at the top showed an elevation of 4,400 feet, at a temperature of 41° F., and our camp to be 2,475 feet lower. The other peak, which is west, a little to the south, is scarcely a mile off, and visibly higher, the difference being only about a hundred feet.

The view was fine and quite extensive; the upper part of the Gulf of California and the sand dunes that border it are not far off. The mountains of Lower California seemed to stretch out in a long, even range. The distant sierras and llanos looked impressive, and as for Pinacate itself, it seemed to be composed of several hundred volcanoes of no great height or prominence, which in their mass form a sierra, as the Mexicans call it, with several outlying cones and craters, especially toward the north. The lava flow, which reaches from the southern point of Sierra Blanca to La Playa in the north, is about forty-five miles long and thirty miles at the widest place.

During the hour and a half spent on top I took photographs of the panorama which spread itself around us, but the north-westerly wind, at first slight and then increasing in strength, began to interfere so much that it knocked down my tripod, breaking one of its legs. The temperature steadily fell until it reached 32° F. and we were all shivering with cold, one of the Mexicans literally trembling. A small fire, which we succeeded in making from some remains of bushes that were lying about, served to warm us up somewhat, though the ache in my finger tips did not abate and brought back to memory bitterly cold days of my boyhood in Norway. Toward sunset it grew hazy and indistinct, clouds began to obscure the horizon drawing nearer as if a storm were approaching. We were all glad to leave the top and to begin our descent, sliding quickly along in the loose cinders and arriving after dark at our sheltered camp.

In the night a gale from the north broke upon us, bringing cold, crisp, and clear weather in its wake. It felt like real winter and in the morning we had to move our kitchen down for shelter into a cut of the arroyo, and also to make a barricade of uprooted bushes and plants against the wind. A hardy humming-bird was observed hovering above the chuparosas.

Quelële, having complied with his obligations, departed during the day, Alberto being commissioned to take him safely back to Sonoita in the wagon which we had left at the foot of the mountains. Clemente, the interpreter, went with him. He had served me well for two or three months and had for some time been anxious to return to his native place, Caborca, to look after his private affairs. He was an able and truthful Indian, who spoke Spanish well, though his extreme sensitiveness to anything that he imagined savored of criticism interfered to some extent with his usefulness. Alberto was to return within a specified time, bringing back from Sonoita the man who was to guide us to the Colorado River as well as provisions.

The clear, cold weather continued for four days; the water froze in our big canteens, and on the ponds in the arroyo the ice was an inch and a quarter thick and had to be broken in order to make it possible for our animals to drink. Water which was put on the fire for cooking purposes was largely in the form of lumps of ice, making genuine American ice-water.

Taking Charlie and the remaining Mexican with me, I proceeded on an excursion to a large crater east of our camp which I had seen on ascending the peak, and which looked as if it were a large circular hole on the plain. It is little known among the very few Mexicans who visit the Pinacate region and had been mentioned to me as the largest and the most beautiful of all the craters here. The only life observed on the road was when one or two of the little ground-squirrels that hold their tails erect, ran across our path, and a raven was noticed sitting on a stump and watching perhaps for some lizard to come out into the sun. One wonders what this bird can find to eat here, but there is a certain tuberous plant growing on the plains called *covena*, which furnishes a favorite food supply.

Approaching the crater from the south as we did, there appears a long, low slanting ridge which is its rim, rising only at the highest point from about one hundred to one hundred and fifty feet above the surrounding country. It is easy to ride up to the top of this ridge. On reaching this and taking a few steps forward, the magnitude and beautiful regularity of the circular opening which yawns impressively before one is surprising. I do not know how deep it is, for I had no opportunity to attempt a descent, which is said to be feasible though very difficult, and it looks difficult too, for the walls have crumbled less than is the case with other craters I saw later in that region. Compared with these, I should think this would be about eight hundred feet deep. The bottom is flat and the talus reaches about half-way up the steep sides. It is probably the deepest of all the craters there, and is by far the most beautiful, so the name Crater Elegante would be appropriate for it.

The bottom looks like quite an attractive country; the same vegetation is observed there as above the surface, and some additional, for, besides the patches of galleta grass, there is a large bluish-white patch that appeared through my field-glass like a growth of the arrow-bush (in Spanish *cachanilla*). This would indicate that there is water, though probably below the surface. Sahuaros are seen to grow down there, as also choya and the barrel cactus, palo verde, and palo fierro; most prominent of all is the white brittle bush which, as white dots, appears everywhere and even up on the sides of the talus. According to Mexican information, a bush called *quáviri* grows there, as well as the plant *istafiate*. Salitre is said to be present in spots toward the south; it occurs on the surface in small patches a mile or so before arriving at the crater.

To get some idea of the size of this opening in the earth, we rode around it, following an old, fairly good trail along the rim. The trail was used formerly by the Indians in their pursuit of mountain-sheep, which occasionally descend into the crater, and fresh tracks of these animals were seen near by. Some of the Indians, armed with bows and arrows, would follow the sheep down, while others would watch for their egress from above. We rode as fast as our horses could walk, and accomplished the circuit in fifty minutes; making allowance for a slower pace one-third of the way, on account of the stony character of the road, I think it safe to say that the opening is a circle three miles around.

It was nearly six o'clock and already dark when we retraced our steps. A chilling northerly wind was blowing, but we warmed ourselves around a large fire of dry ocotillo and departed. As long as Venus gave light we travelled pretty well, stopping several times for a few minutes to warm ourselves. It was only a matter of a few moments to make a fire by throwing a match into the tall, dry galleta grass, patches of which we passed now and then. The wind blew the large waves of heat over us and our riding animals, which seemed to enjoy the comforting warmth and even the cheering aspect of it as much as we did. There is at least one advantage in travelling in the desert, and that is that there are so many inflammable bushes and trees. A fire can generally be made quicker here than in any other country I know of; a match to the choya and all the bristles take fire as if they were tinder, and the spines of the sahuaro burn in the same way. The small bush tovoso, which grows everywhere in the desert region, contains so much resinous matter that it burns even when green and wet; for the same reason the primitive looking *canutillo* (*ephedra*) of the sand dunes furnishes a flaring blaze. Dry ocotillos are often seen lying about on the ground, especially along the bases of the mountains, ready at a minute's notice to make an excellent flame. The sahuaro or the choya when dry burn almost equally as well, and the brittle bush may serve as fuel when the fire is already made.

After a while it grew as dark as night can be, and we could not see each other as we walked leading our animals one after the other in order to keep warm. The rough, black lava ridges we now and then had to cross tried us sorely, and the brittle bushes were our only guidance here, standing out as whitish spots among the now invisible but hard and sharp lava blocks. Once I stumbled down a small lava ridge, which to the eye appeared as even ground; I swung down and down over big blocks, landing finally with my right hand against the rough lava; my escape from breaking a limb was truly wonderful.

About ten o'clock we arrived in camp, tired and prepared to eat anything in sight. The shelter of bushes in the arroyo, which we called *la cocina* (kitchen), beckoned to us very hospitably with its substantial fire of palo verde wood and the ollas, pots, and kettles standing warm awaiting us. Guadalupe had retired for the night, but arose to take care of our riding animals. He had a splendid supper ready consisting of boiled mountain-sheep with bones and consommé. I know of no meat that can compare in flavor with that of the mountain-sheep, even if the animal be old. Also the Indian possesses the secret of boiling meat slowly, and the *frijoles* (beans) served were for the same reason excellent without the adding of any lard; few people know what a delicate, though little pronounced, natural flavor beans have. Until I had been among Indians I did not know this, and only extreme hunger would now induce me to eat the tasteless horror of so-called Boston baked beans. Guadalupe had made for me in addition some tortillas of very fine quality, and I congratulated myself upon having such a useful Indian with me.

CHAPTER XIV

CHANGING CAMP—MOUNTAIN-SHEEP—THE USEFUL GREASEWOOD —PALO FIERRO, THE FRIENDLY DESERT TREE—*LOS MÉDANOS*, THE GREAT SAND DUNES—UNUSUAL TRACKS—ABANDONED INDIAN CAMPS—NEW SIERRAS—LA TINAJA DE LOS PAPAGOS—VISIT TO A CRATER

ON Sunday, January 9, we moved camp to the place where Alberto and the guide were to meet us, in the southern Pinacate Mountains, one mile from the pool called Tinaja del Cuervo. We followed an Indian trail descending to the llano, and as we passed an old Indian camping place near a water pool, a large olla was found entire among the greasewood bushes and a big sea-shell used by the Indians as a drinking vessel was lying on the ground. In the arroyos that run down from the mountains the palo fierro grew to unusual size and beauty, and quails, doves, and other birds were about. I remained behind and as I rode along, taking topographical notes, I was suddenly confronted by a coyote, dragging its hind quarters painfully along, apparently paralyzed. At first sight I thought it might have rabies; then, as I rode nearer to take a photograph, the animal simply lay down, offering no resistance even when my terrier began to look it over. It had a fresh wound in the left side, which told me that it had been struck by a bullet from my party ahead. Mâvit repeatedly dug his nose into its side and back, but he did not seem to want to do it any harm.

After a march of about five hours, over good road mostly, we arrived at our destination, an inlet from the llano at the base of the mountains, well protected by sheltering ridges running down from above. An abundance of galleta grass was growing here, and hence the locality was called Galletal. Mezquites, palo fierro, and various bushes indicated the course of an arroyo, near which we made camp. The Tinaja del Galletal, three-quarters of a mile higher up the arroyo, was found to be dry, but in another arroyo, a mile north of our camp, there was water in the Tinaja del Pinto, known hitherto possibly only to the Indians, though trails led up to both pools. I found this to be a better camping place than the Tinaja del Cuervo, close by, the usual stopping place of Indians and Mexicans on their salt expeditions to the coast.

We had plenty of partly green grass and much wood, the situation was very pleasant, and I greatly enjoyed the calm and mild weather after the cold and windy week we had just passed. The locality was alive with quail; in the mornings after dawn they would begin emitting a low cackling note while feeding in the quáviri trees (*lycium*) that grew here and there about the camp. These small, pretty trees with their light green foliage seemed to be the favorite feeding ground of the quail. Both the young leaves and especially the red berries are eaten; the latter are also relished by the Papago, either dried or boiled. It is strangely difficult to see these birds when feeding or roosting, though they frequent trees that, compared with others, have small leaves and few of them. It was surprising to find that a tree of small dimensions might harbor as many as a couple of dozen feeding among its delicate foliage. These birds rest for the night in the mezquite and the palo fierro.

It was desirable to have dried mountain-sheep meat for our proposed expedition to the Colorado River, and I also wanted to preserve some skins and skulls for scientific use. This was welcome news to the two Mexicans, who were very anxious to start shooting. The first day's hunt resulted in ten shots being fired at one animal without apparently wounding it seriously, if at all, but the second day, after dark, they reported that they had killed six sheep which they had encountered up in the mountains four or five miles away. They had shot them in the course of two hours. According to their story, and this was confirmed by my experience later, generally those of a flock which are not hit do not run far, but soon stop to look at the intruder. They are stupid, though nervous animals, and very inquisitive; as one of the Mexicans expressed it, they lend themselves very well to the camera. Our principal hunter gave it as his opinion that if one shoots at a mountain-sheep without hitting him, he looks at you, for *el cimaron es muy hombre* (the mountain-sheep is very courageous). These animals never attack man, but in the summer the males fight much between themselves. The skins which I brought back from this expedition are all from *Ovis Canadensis Gaillardi.* It is a smaller animal than that of the Rocky Mountains. The horns are long and strongly incurved. Mountain-sheep are found in most of the sierras of southern Arizona and north-western Sonora, from Tinajas Altas to Port Lobos, especially in the Gila, the Cabeza Prieta and the Mohawk Ranges, Sierra de Cubabi and Sierra de Santa Rosa. They may still be encountered in Sierra del Viejo and Sierra del Alamo and in rare instances survive almost as far as the neighborhood of Hermosillo. These are all one species.

We now had more than sufficient game for our needs, and for two days we were kept busy bringing the quarry in, skinning and cutting the meat in long strips which were hung up to dry. Even dry, this meat tastes very good, and does not grow hard as that of oxen. Some of it which I brought to New York had preserved the same pleasant flavor, although it had been cured without much care and was over a year old. It is much improved by sprinkling salt on the strips before drying. Alberto and our guide, Clodomiro Lopez, arrived opportunely to help us in our butchering.

The two Mexicans I had sent to investigate the condition of the small tinaja near the north end of Sierra Blanca to the south of us, found it dry. It does not last usually more than three months, so a contemplated visit to this little-known locality had, therefore, to be postponed until a more opportune time. After our horses had all been shod for the hard malpais, as the Mexicans call the lava flow which we should have to traverse, we started, continuing to skirt the Pinacate until we reached the starting point for our western expedition. Our pack animals were eleven, four mules and seven burros.

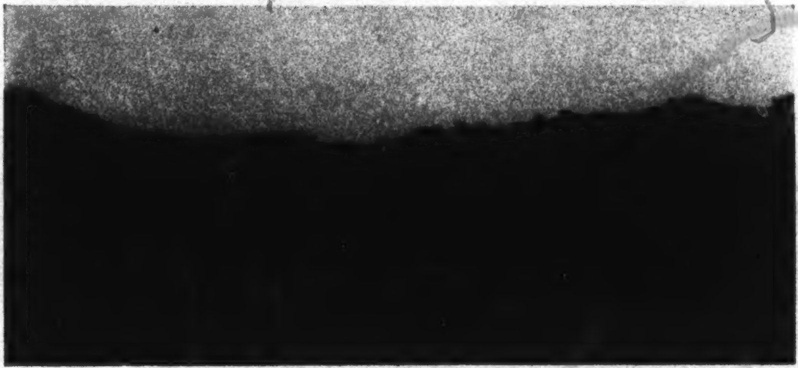
As we gained a point of vantage on the malpais, which stretched widely down from Pinacate, high sand dunes appeared against the overcast sky about two miles away. The sea was some fifteen miles distant from here and would have been visible but for the dull day. At first sight the row of big sand-hills appeared as if bathed in a dim sunlight, but this was only apparently so and is due to their peculiar light roseate tinge, which is less marked in the low dunes near the sea where the sand is much lighter in color. We approached them nearer and nearer, and finally travelled beside them over sandy flats that run up among the low lava ridges. Among the lava small green bushes, evidently owing their existence mostly to moisture from the sea, made their appearance.

We still had the greasewoods with us, though much more scattered; even in the depressions between the great waves of the dunes this bush ekes out an existence, though often half buried by the sand. Here for the first time I had occasion to see its mistletoe, a parasitic plant called by the Mexicans *tóji;* it is found only on the coast and is famous among the Mexicans as a wonderful remedy. A tea made from it is supposed to relieve all kinds of stomach ailments from colic to dysentery. Clodomiro, the guide, found this tea so refreshing that he used it as a beverage whenever he had an opportunity. Parasitic plants of similar appearance also grow in abundance on the palo verde as well as on the palo fierro and on the mezquite, but they are of another kind and not of medicinal value. The one on the greasewood of the coast is not very common. I have not tried its efficacy, but, judging from the extraordinary antiseptic properties of the bush on which it lives, I am inclined to think well of the remedy. Steeping some twigs and leaves of the greasewood in boiling-hot water produces a remarkable antiseptic. My dog was bitten once by another dog at a particularly delicate place, and the wound, somewhat hidden from view, caused great inconvenience after a few days and was much swollen. Even after having been liberated from maggots, which were found to be the main cause of the trouble, the dog was very ill; he could walk with difficulty and it seemed very likely that he would die, but within twelve hours after the application of this simple remedy he had recovered.

The greasewood is the ever-ready and unfailing remedy of the ranchero and of the Papago for all kinds of wounds. It is also taken internally in case of any gastric disturbance. The Mexicans have many remedies, but this is one about which there is no difference of opinion. For internal use, however, the parasitic growth of this bush is considered superior. The American frontiersman by steeping the mashed leaves of the greasewood in water produces what he considers a wonderful laxative. The greasewood supplies a few of the not very numerous wants of the Papago. A piece of this wood tied to a sahuaro stick, for instance, furnishes a hook for bringing down fruit. The small rasping sticks which the medicineman employs when treating members of a salt expedition,

THE LONELY PALO FIERRO
An unusually large specimen on the llano, before arriving at Tinajas Altas

GREASEWOOD BUSHES



HAULING PALO FIERRO BRANCHES FOR CAMP FIRE AT DUSK

are made from greasewood, while those used for other purposes are made of various materials to fit the occasion. The secretions of a scale insect *carteria*, which are deposited on the branches of this bush, serve the Papago for several purposes. Handles for the awls which the women employ in the manufacture of baskets are of this material, which is first dried in the sun and ground, then heated on a piece of crockery over the fire, and moulded into shape. Also balls for the foot-races are made from it, a stone being placed inside. Besides it serves for mending pottery.

The greasewood is as hardy as the cactus and the hardiest of all the trees or bushes of the desert. It contents itself with poor soil if necessary, but it attains its finest development on the rich detritus of the llanos. Perhaps the varnish-like substance which covers its leaves and makes them sticky helps to protect the plant by preventing evaporation and its roots probably reach down very deep. However that may be, it is always flourishing, even in the fiercest heat. To me the greasewood is a symbol for health and an example of cheerful existence under adverse circumstances. It gives out an odor which it would be impossible to count among the perfumes of the world and which suggested the name creosote bush contemptuously applied to it. The Mexicans for the same reason call it by the uncomplimentary name *hediondia*. To some people like myself its odor, being salubrious, is more pleasant than otherwise. Though, strictly speaking, nothing in nature is ugly, the greasewood could not be called beautiful, except, perhaps, when covered in the spring with its small yellow, jolly flowers. It may be compared to a person radiant with health and good cheer, for which he is liked, though he may not be handsome. Were I a poet, I should sing the praise of the modest greasewood of sterling qualities.

Half a dozen quails looked lazily at us from the top of a large sand dune as we passed along. The small reddish tree called sangrengado was seen at intervals; its finer branches serve the Papago as material for basket making and, as well as the bark, offer tempting morsels for the mountain-sheep. The fragrant odor of copal was evident for a little while, although we did not discover its source.

We camped on the sand for the night. Although there was considerable galleta grass growing here and there, all the mules, donkeys, and horses gathered at once around a lone but very large palo fierro tree to eat its dark green juicy leaves, which they much preferred. They stretched their necks like giraffes in eager competition and, paying no heed to its numerous thorns, they pulled away mouthfuls of leaves. We usually cut down large branches, Mexican fashion, from which they could feed more comfortably. The palo fierro (*olneya tesota*) is to one who travels in the desert the most useful of all trees; whenever it is to be found, his animals are sure to get something good to eat, and the man who gathers wood for the camp first of all directs his steps toward it. Usually some of its branches are dry, and they furnish the very best camp-fire, especially for cooking purposes. In the cold winter, when a warm fire is needed, the traveller should look for a dry log of this kind. As the wood is extremely hard—hence its name, iron-wood—the easiest way to fell a dry tree is to make a fire round the base. It ignites easily and burns the whole night through without any further attention. During many months of travel in the desert, I was always thankful when I caught sight of this tree which harbors so much comfort for man and beast. In the spring, before the leaves come out, it has beautiful flowers of the pea family.

There was, of course, no water here, but at this time of the year animals that are being worked do not suffer from going a couple of days without drinking. In the winter at Sonoita the horses running loose in the neighborhood come in to drink only every fourth day, and in the summer every third day. For our own consumption we had our generous barrels which we refilled when occasion offered. The sand was temptingly clean and made a soft bed, all the men delighting in it. The next day I remained behind with the guide in order to examine the sand dunes. That part of the sand-dune belt where we were, south of Pinacate, starts only twenty to twenty-five miles east of there. The height of a sand-hill that we ascended was one hundred and eighty-five feet, both my aneroids giving the same result. I calculated the length of its base, which was measured by the steps of our horses, to be at least two thousand eight hundred feet. There were others equally high or higher. Farther west, toward Laguna Prieta, are found the highest sand-hills, but they would probably not be much above two hundred feet, if measured. On top of the one we climbed, an absolute calm reigned. Toward the west as far as the eye could detect the dunes extended, like the sea when exposed to a strong gale in appearance, though with waves much more irregular. The large ones, forming the extreme northern part of the belt, were fewer than I expected. Southward from our hill the waves first became considerably smaller, then grew somewhat higher again before reaching the coast, where they ended in more or less irregular sand flats or low hills. The sea did not seem more than eight or nine miles away.

The Mexicans use the euphonious name médanos for the sand dunes, great and small; in fact, the whole region along the upper part of the Gulf east of the Colorado River is thus designated. The name has an almost mystic sound, suggesting in the summer aridity and danger, fierce heat, rattlesnakes, and other reptiles—in the winter cold wind, fog, and occasional drizzling rain.

Most Mexicans are afraid of los médanos, as they themselves have told me, on account of the risk of losing animals and of the troubles in general connected with travel there. As is the case with all regions about which little or nothing is known, the sand region is reputed to harbor fabulous wealth of gold and silver in its hill-tops and mountain ranges, and a lonely prospector with a couple of donkeys sometimes attempts in the winter an exploration for these precious metals. His expectations may lead him farther than is prudent, and his canteens may give out too soon for him to have time to return for water. There is nothing depressing, however, about the sand dunes. In the late afternoon sun, when seen from the north, they look especially picturesque, running one after the other in long, majestic, though somewhat uneven, waves of light roseate hue.

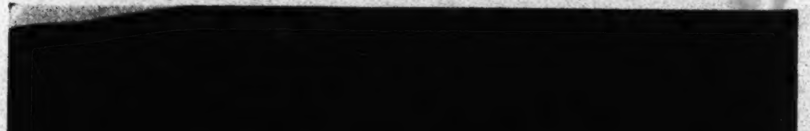
A curious feature of the dunes south of Pinacate was a remarkable display of tracks made by the big beetle from which the whole region derived its Mexican name. These insects (*eleodes*), of which the body may be over an inch in length, were numerous at that time of the year in the northern part of the sand dunes. In certain localities they are the principal means of subsistence for the coyote. They wander far and wide on the sand, leaving surprisingly large tracks, most of which are fairly straight. The weather had been calm for twenty-four hours at least, and the tracks were even more distinct than those seen on cold, hard snow. The long lines ran almost parallel to each other across the great fans of sand that stretched down from the tops of the dunes. Some of them ran upward, for these beetles wander to the very summit. One of them in coming down the slope of a drift had amused himself in going in a spiral line for many yards and then continuing in his ordinary fashion. The beetle to which this pictograph was due was undoubtedly a different species, because its tracks were somewhat lighter and the straight line less pronounced. Another one had for many yards followed the ridge of a sand drift, but progressing all the while from one side to the other, and leaving low, hanging festoons from the top of the ridge in regular serpentine figure. Only one, making his way very straight and quite fast up the slope toward the ridge on which we stood, was actually seen. I was puzzled as to why these insects should go up there on the sand dunes, but, whatever their reasons were, they certainly left in their wake beautiful decorative marks hundreds of feet long.

The pool called Tinaja de los Chivos was reached on a slowly rising lava flow ten miles north of the sand dunes. There is no grass within a mile or two of this camp, which derives its Mexican name from the vulgar designation of mountain-sheep as *chivos*, goats. Fuel is also scarce here. It is the largest of all the natural water tanks of the Pinacate and lasts longer than the rest. It is situated at the junction of two arroyos, and at one of them, a mile away, is found another reservoir, called Tinaja del Tule. The following morning the sky was overcast with stratus and light nimbus clouds, and the long even range of Lower California looked quite impressive in the hazy atmosphere. Before sunrise we had a beautiful tanager-red glow which extended over the western horizon before it assumed a blue hue.

In order to reach the next place where water is found, Tinaja de los Papagos, a circuitous route has to be followed. In descending to the dunes again, we found a very good track which led to the head-quarters, four miles away, of the former sand-dune people. The trail was worn a foot deep in places, and stones had been removed to smoothe the path for the busy feet of the women who had to go this distance every day to fill their jars. We discovered two old camps at the edge of the dunes, each on a low sand ridge. There were the usual features of rude corrals of stones, but the sand inside of them had been scooped out, leaving a hollow. Some-

Mountain sheep, female

Tracks of beetles (*Eleodes*) on sand dune



Tracks of beetles (*Eleodes*) on sand dune

times pits were noticed without any stones around them. On a plain near by feasts and ceremonies had in former times been performed, and among them the great annual festival which is now given at Quitovac.

The afternoon turned out to be moderately warm and calm, the sun appearing now and then, and the weather, for the middle of January, was very enjoyable. I ascended a small ridge at one side of the track to get a better view of a crumbling and much serrated sierra which appeared in front of us, and near which we were going to camp. It showed two formations, most of it the usual gray, weather-worn granite, but at the south-eastern end an intrusion of a reddish rock had taken place, which proved afterward to consist of rhyolite with an oxydized rim of red. South of it at a short distance stretched a low, jagged range, half buried in the sand. To the north-east, south of the Gila Range and far away at the end of a large llano, a single mountain was seen. It looked deep blue and, having no name, we called it Cerro Pinto, because its color is different from the rest of the mountains. The distant country westward, directly in front of us, presented a sea of sand dunes that seemed to stretch on indefinitely, offering a fascinating vista. Just as the sun, breaking through the clouds, covered them with a brilliant white light, I turned around to secure my camera, and in doing so was delayed scarcely a minute, but when I looked again westward, while adjusting my kodak, all the magic of the scene was gone—the sun was hidden from view and all chance of photography over, though I waited half an hour for another. An opportunity to take such a picture never did return as long as the expedition lasted. The lesson I learned from this is appreciated by every one who is interested in photographing, and that is to be ever ready at the very moment the opportunity offers itself.

While our animals were taken the next day for water to the tinaja ten miles away, I spent a day at the base of the much serrated sierra in order to examine this mountain range as well as the other one that is partly buried in the sand. I named the first one Sierra Extraña (Strange Sierra), because its gray color with a tinge of green seemed so strange to us after having been so long accustomed to the dark lava. It is only about six miles long, running in the main direction of the rest of the mountain ranges. The outer granite is crumbling more than on any other sierra observed on the journey, hence its native name, kokomaleke (small stone blocks). It is devoid of vegetation except for a few struggling ocotillos and greasewoods, and a sangrengado now and then. On the south-western side the wind has blown up the sand somewhat on the sides, but, seen against the dark background of Pinacate, the little range with its exaggerated serration shows to advantage. The other sierra, which I called Sierra Enterada (Buried Sierra), some six miles south of it, is nearly the same length, but lower, the crest reaching an elevation of about one thousand two hundred feet, three-quarters of it being buried in the sand dunes. From the top we could plainly discern the fresh tracks of a horse, leading westward through the great waste of sand.

My guide thought that a solitary Indian called Caravajales, one of the former sand people who persists in living out there, had passed. This hermit makes his headquarters at the Tinaja de los Papagos.

In the low sand dunes among the greasewood bushes I noticed once or twice a tiny spray of sand being thrown up as if caused by an ant lion, but the insect could not be found. I later came across a small representative of animal life here, a roach with long legs, which was known to my guide as found among the sand dunes, though he said it was rare. A mocking-bird (*mimus*), very inquisitive and which had evidently never seen people before, arrived in our camp and moved about fearlessly, passing my camera within four feet. It actually alighted on the toe of the shoe of one of the Mexicans who was sitting on the ground and next settled on the rim of a large dish, dipping itself repeatedly in the water and drinking of it. These birds are often seen far from water.

Six miles before arriving at Tinaja de los Papagos we passed numerous burrows of the badger. This animal, too, does not seem to care much as to whether he lives near water or not. When we came to the abode of the Indian hermit, Caravajales, who would have been a useful man to take along through the western desert, we found him to be absent. After sunset hundreds of pigeons came in a steady stream to drink, settling first on the rocks for several minutes before finally flying to the pools, two of which at that time contained water; the stony sides of the latter were literally covered with the birds, and after dark the last ones flew away. There are three pools in this wild-looking arroyo, which at the time of showers gather the precipitation for many miles up in the lava flow. The middle one was dry and the water in the others was low. The lower one, nearest our camp and very accessible for the animals, could not then, according to our guide's calculation, be made dry by three hundred head of cattle drinking at one time. Water can usually be depended upon at this camp.

The watercourse, from forty to sixty paces wide, can easily be made out on the big hard andesite boulders from a distance, and, on examining the surface, it is found to be actually polished by the action of water and has rather a faded color. That such should be the case is very remarkable, considering the extreme hardness of the rock and the great length of time that would be needed to accomplish this effect, if the water were supplied only from a few showers in July and August. This seems to me another proof of the climatic change that has taken place in the desert region of Arizona and Sonora, the polish of the rocks probably dating from a comparatively recent time when precipitation was more abundant.

The next day a tour was made to a large and beautiful crater, two and a half miles north-east of the tinaja, to which a fairly good track leads. In the morning before sunrise the same phenomenon of sunlight by refraction that I had noted twice before was observed, though the coloring was stronger; it was very noticeable in my tent, the light beginning twenty minutes before sunrise and

CRATER ELEGANTE

THE WATERCOURSE AT TINAJA DE LOS PAPAGOS

fading away a few minutes before the sun rose, and it was strongest twelve minutes before the actual appearance of the sun.

Half a mile from the pools I photographed an Indian habitation, of which there are several in the neighborhood. They seem to be more recently deserted than others met with before; in fact, as stated above, one man still has his abode there. The corral, or sleeping place of the family, was made up of a few stones and uprooted tovoso bushes placed in a circle. Between the stems of an ocotillo was a platform consisting of a layer of white brittle bush and tovoso. This had served as a shelf for jars and other cooking utensils. Though several years must have elapsed since this place was occupied, Clodomiro found an old spade hidden under the platform and some medicinal herbs, the latter wrapped in a cotton cloth.

The crater is very easily approached. The rim is one hundred and thirty feet high at the place we ascended, which was at its highest point. To descend either from the south or the west into the crater involves no difficulty; it took Clodomiro, the guide, only twenty minutes to do so from the south. I have been down twice at this side to an embankment that runs around the crater inside just above where the talus begins. Measured by the aneroid barometer, this is two hundred and eighty feet down, and less than ten minutes are needed for the descent as one slides along on the cinders. The depth, taken by Mr. G. Sykes in 1907, seven hundred and thirty feet, appears correct. He found the diameter at the bottom to be one thousand four hundred feet, and the bottom one hundred and fifty feet above sea-level. It is a beautiful and impressive crater, and was first visited in 1882 by Sr. Y. Bonillas, the mining engineer in Nogales. In grandeur and regularity of shape it is in the Pinacate region second only to Crater Elegante. There are several large craters in the Pinacate region, but none as perfect in shape as these two, which present very clearly the phenomena connected with their structure and origin and must be of unusual interest to geology.

Clodomiro tried in vain to start out some mountain-sheep from below for me to photograph. He heard distinctly the noise of rolling stones in the great talus and my attention was called in the same way. But it is strangely difficult to see the sheep under such conditions, as their color is so much like their surroundings, and, as the Mexicans said, "they stop behind the stones and you cannot see them." Clodomiro scaled the talus almost opposite to where he had made his descent, reaching the ledge that led to my point of observation, from which we again ascended to the rim. He saw many fresh tracks at the bottom, all of them being, according to him, those of females with young. During the entire year the mountain-sheep are in the habit of going down into the craters, but they are more prone to go there during the winter, when they have their young, which is said to be in November. The vegetation below was the kind described at the time of our visit to Crater Elegante, and in addition there were many choyas seen. Both galleta grass and the fine grass called *sacate fino*, or *sacate de lievre*, were observed there.

CHAPTER XV

WESTWARD—LOOKING BACK TOWARD PINACATE—TINAJAS ALTAS—ITS DISMAL MEMORIES—SUNSHINE AND MOONLIGHT OF THE EARLY MORNING—EL CAPITAN—LAGUNA PRIETA, A SALT LAKE—A LONG WAIT FOR WATER—HOW FRESH WATER APPEARS AMONG BULRUSHES—APPROACHING THE COLORADO RIVER—COLONIA LERDO—THE INDIANS AT THE LOWER PART OF THE GREAT RIVER

On Thursday, January 20, a start for the Colorado River was made. Our guide, Clodomiro Lopez, and his brother, having first by explorations ascertained that it was feasible to do so, had taken several herds of cattle from Sonoita over our present camp to Laguna Prieta and from there to Colonia Lerdo on the Colorado River, their first trip having been made in October four years before. There are about eighty miles without water by the route which he chose and which is the straightest, and the undertaking would have been impossible but for his discovery of a small tinaja (natural tank) in Sierra de Lechugilla; even thus the risks taken were considerable, and many of the cattle died from thirst.

The question for us to decide was whether we should follow the same route, hoping that there might be water in the Lechugilla tank, or whether we should take the more circuitous one over Tinaja del Tule and Tinajas Altas. Clodomiro, the guide, maintained that even though the tank lasts only for three months, our chances for finding water there were good, and even if it should turn out to be dry, we could reach Tinajas Altas in three days without water. I was inclined to accept the guide's opinion inasmuch as our animals were in good condition after their long rest in Pinacate, but Alberto, who was the owner of some of them, was little inclined to take any chances, and as I should be able by the safer route to cover more ground, some of it of considerable interest to me, I chose that one.

The sand dunes which stretch northward from the main belt, at no great distance west of Pinacate, are easily crossed. The long, low ridges run here in a general direction of north and south, forming a belt four miles and a half wide. The highest point reached was, according to my aneroid, about one thousand four hundred feet. In crossing this belt from the east one ascends very gradually; after a while small ridges, from a quarter to a half mile long, appear for about a mile; then for two and a half miles the ridges are larger though low, a mile or two, or more, long, and there is half a mile between each one. The last ones are the largest. I found the sand to contain moisture six inches below the surface, and at one place I gathered some of the beautiful large white flowers with which I became familiar later (*œnothera trichocalyx*).

After a comfortable night spent on the outskirts of the sand dunes we proceeded in a northerly direction between two mountain ranges, to the east Sierra del Tuseral, about thirty-five miles long, and to the west a sierra without name, about seven miles long and running toward the first one in an unusual northerly course. As this mountain range looked singularly picturesque viewed from the

Paso de Juana

UofM

north-west, I have named it Sierra Nina for my friend, Mrs. John Gray, of Boston. Where these two ranges approach each other there are two passes, formed by a small intervening mountain; the western pass is the narrower, and I named the eastern, which is quite beautiful, Paso de Juana, for my friend, Mrs. David Lydig, of New York.

This pass is only three hundred feet higher than the sand dunes we crossed, and the ascent is very gradual, but, as one looks backward on approaching the pass, one has, on account of the varied colors, a surprisingly fine view, enclosed between the two mountain ranges as if in a frame. The different shades of green in the desert vegetation, from the light one of the sahuaro and the ocotillo to the very sombre one of the greasewood, are bordered by these two light gray diverging sierras, and some dark reddish foot-hills in the foreground add to the variety. Then follows transversely the light roseate hue of the sand belt and, above all, rises in the distant background, the dark mass of the Pinacate Mountains, appearing quite lofty through the pure air against the azure sky.

At Tinaja del Tule we were again on the old trail from Caborca to Yuma, where we watered our animals and filled our barrels. The pool is half a mile up a narrow gorge and I was surprised at its small volume, only twelve feet in diameter and three feet deep in the middle. Still, as it is in sand, it contains somewhat more water than is apparent, and it would cover a horse standing in it. There are some smaller tanks higher up in the gorge which at times have water. As soon as our thirsty crew had been satisfied and had departed, two butterflies alighted on the wet sand, one of medium size and brown, the other a small blue one. It was just noon and the cañon felt pleasantly warm at 74° F.

The landscape which from here on presents many sierras, at first near and then far, looked attractive in the afternoon sun, making the mountains impressive and seem much larger than they were in reality. We camped on the extensive llano bordering the Gila Range toward the east, near a palo fierro tree of unique size, which rises in lonely grandeur above the lowly greasewoods and is visible at a great distance. According to the Mexicans, a whole family of fourteen was wiped out here by the Papago Indians forty years ago; the Apaches never came so far west. Whether such is the case, or whether, as another report has it, the family perished from lack of water, their graves are to be seen near by marked by small stones placed in the surface so as to form crosses. There is no water here, but enough grass, both galleta and sacate fino, for pasture.

The soil on the llano was moist underneath the surface which told us that during the stormy days of abortive attempts at rain, which we had experienced at the end of the year, rain had actually fallen here.* It further indicated that we should probably have found water in the small pool discovered by my guide in Sierra de Lechugilla, if we had chosen the more direct route to Tinajas Altas. For the possible use of some future traveller, I give here its location as it was described to me. It is on the western side of the Sierra de Lechugilla, at the base of the highest top, and is situated at a point which from the north is one-third of the length of the entire range.

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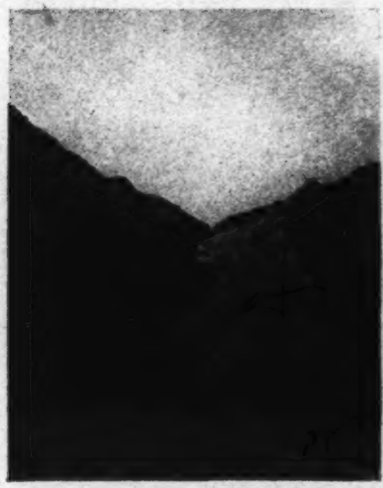
* According to the reports of United States Weather Bureau, the rainfall at Yuma, which is sixty miles from here, was on December 31, 1909, only $\frac{18}{100}$ inch, and on January 2, 1911, there fell $\frac{2}{100}$ inch.

As one approaches Tinajas Altas, little by little ascending from the llano that stretches northward as far as the eye can follow, a beautiful view is had of the mountains left behind, and among them the picturesque range called Cabeza Prieta and the Tordillo Mountains, both of delicate light gray color with curious intrusions of very dark reddish rocks of volcanic origin. The range derives its name, which means "black head," from this strange contrast of color.

Tinajas Altas is a landmark in the local and recent history of that desolate region. It is a dismal looking place and, after having been accustomed to the absolute cleanliness of nature, the experience of again meeting with pieces of cast-off clothing, rusty tin cans, and other cheerless marks of human occupancy which were apparent here was not a pleasing one. There is a large space for camping at the lower end of the little valley which begins at the foot of the mountains where the principal pool is. An embankment of gravelly detritus shuts off the view toward the east, while high granite rocks, bare and hard, rise forbiddingly on the other sides. Large boulders which were once detached from the rocks above are lying at the base of the steep mountain sides.

As a curious bit of information from the desert I may mention that at this camp, on January 23, I was bitten by a mosquito, a few large ones being about. The sierra is probably at this place narrower than elsewhere, though it must be nearly a mile across. When rain falls the formation is such as to favor the gathering of water into one stream which rushes down the eastern side and is retained in eight natural cavities, one above the other. The lowest tank is very accessible, but the rest are not, and there are stories of people having nearly come to grief on attempting to climb the steep and slippery sides. My guide told of a mountain-sheep that once, when cornered, tumbled down in trying to escape and fell into the lowest tank. A prospector in Tucson, who ascended to the top, described to me a large sand basin above the tinajas, a few hundred feet south of which are a number of caves where pictographs are seen as well as pounding-holes in the rocks. Not having been there myself, I give the information with reserve. The sand Papagoes had an important camp at Tinajas Altas. The native name of the place is Óovuak, "where arrows (*óo*) were shot (*vuak*)." Two of their hero gods shot arrows from each side of the range; one did shoot across, but where the arrow of the other one fell the pools came forth.

Until recently mountain-sheep were extremely common here. Travellers, who in our days pass only at long intervals, used to shoot them without any difficulty. On one of the three occasions that I visited this place a sheep watched us from the crest above for many minutes. Their number has of late greatly decreased. Ten



Tinajas Altas

Clemente: Papago

Filling our barrels and canteens at Tinaja del Tule

years ago, when the guide and his brother rested here in the middle of the day, they noticed sheep around the upper pool; the animals were having a siesta, but scenting intruders began to move off, walking up the mountains in a steady stream of forty-five by actual count. From curiosity the Mexicans climbed up to take a general look at things, and were astonished at the exceedingly strong odor left in the camping place of the sheep. On another occasion, in the winter, the brothers heard during the night a great deal of noise from the tops of the rocks that rise immediately above the camp. The sheep were tramping on the hard granite as if they were horses with iron shoes. It seemed uncanny to the men, and they thought of the many dead buried here; they began to imagine that perhaps the dead were moving about, and wrapped their blankets tighter around themselves. Clodomiro, who otherwise is no coward, assured me that he would not care to sleep alone at this place, and Alberto quite agreed with him.

The locality harbors many unpleasant memories; in the days of the California gold excitement, as well as later, many people passed by here, and the lowest and most accessible pool did not last very long. Too exhausted to climb higher up, many died from thirst. Capt. D. D. Gaillard, of the International Boundary Commission, relates a pathetic story of three exhausted prospectors who perished at the foot of the almost vertical slope; their bodies were discovered a few days later, the fingers worn to the bones in their dying efforts to reach water which was found in abundance in the tank above. Others would fight for the possession of the water and kill each other. People were murdered who were suspected of carrying gold or other valuable possessions. The dead were buried on the top of the embankment that shuts off the view toward the east. A small cross of stones embedded in the ground indicates where a person is buried underneath. We counted fifty-four of such crosses here; time has perhaps destroyed as many more and there were many, no doubt, who were buried without any sign to mark the spot. Holes had been dug in the ground at three or four places in the hopes of finding riches, for tradition has it that travellers, their animals having given out or for other reasons, buried their treasures here, and even the camping place had been searched for these.

On the day of our departure for the Colorado River we coaxed our mules and horses in vain to drink; they had satisfied their thirst the day before and did not care for any more the next morning. The burros, however, which on the whole seem able to take better care of themselves, went to the pool voluntarily and prepared for the day by drinking. The sierra is easily crossed by a circuitous route a little farther north which finally takes one through a natural pass. Coming out on the western side, that which appears most striking is a picturesque sierra rising boldly from among great sand dunes toward the south. It can also be seen from Pinacate and from the Colorado River. It looked deep blue in the hazy and calm afternoon as we began to leave it behind. Though not visited by whites, according to reports, this mountain range has received various names, of which the most appropriate is Sierra del Rosario.

The next morning, Tuesday, January 25, I again, and for the fourth time, saw sunshine by refraction, and this time along with the moonlight of the early morning. The sun shone into my tent, the opening of which looked toward the north-east, for twenty-three minutes before it rose, and the full moon was bright at the same time for five minutes. Although the coloring in general was light orange red, and in the east brilliantly so, the moon was surrounded by a deep blue light. During the night there had been a strong breeze from the north which had died out, and a light air current only from the same direction remained. There were cirrus and stratus clouds about; the atmosphere became more and more hazy, and when the moon set, which was as far as it was possible to judge correctly, eleven minutes before seven, the atmosphere was so hazy that one could fancy oneself at a seaport instead of in a dry desert. Although a moderate northern gale sprang up at ten o'clock in the morning, the atmosphere continued hazy.

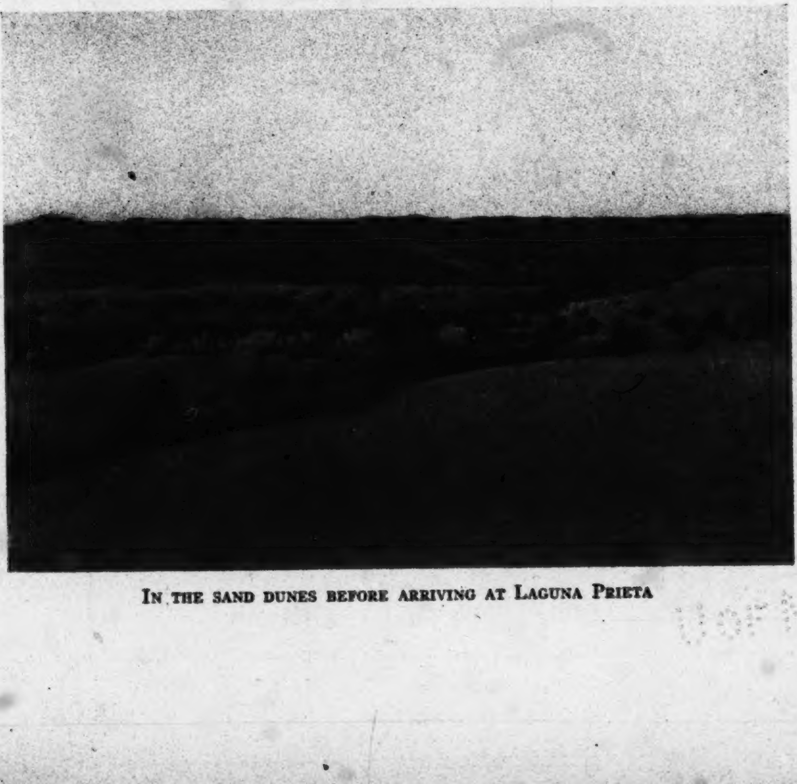
We passed Monument 194 and continued our course toward a lonely hill which had been visible on the western horizon since our exit from the sierra. For future travellers this is a very important landmark; it leads in the right direction toward Laguna Prieta, where the first fresh water will be found after leaving Tinajas Altas. I called this mountain El Capitan.

The extensive flat country over which we passed slopes gradually down to the sand dunes. In parts it consists of small fertile basins where sunflowers (*encelia eriocephala*) and two kinds of *herba del negro*, *sphæralcea incana* and *s. oruttii*, grew, especially the latter, which appeared in great numbers. Though waterless, the region has in a few places, as for instance near El Capitan, excellent pasturage and this favorable condition continues almost up to the Colorado River; at first our animals depended upon the coarse galleta grass which was then green, but beyond Laguna Prieta there appeared more of the delicate looking grass called sacate fino, which grows desert-fashion, each plant widely separated from the other, and is much liked by cattle and horses.

El Capitan is in reality several hills. Of the two nearest to our approach, the south-eastern one, El Capitan proper, consists of slate; the other one is a limestone formation, in horizontal, varicolored streaks of white, brown, and slate. For about a mile before reaching El Capitan we crossed small mesas covered with smooth, very pretty, water-worn pebbles, of jasper and quartz, which my men eagerly gathered as curios. They were also observed later by the thousands in similar localities as far as the Colorado River, and were souvenirs of a time when that whole country was under the sea.

To reach Laguna Prieta was a more laborious task than we had expected. It seemed a long distance, and as the guide and I rode along behind the rest of the party, I expressed my astonishment at his feat of having taken cattle over this route and successfully arriving at the Colorado River. No tracks were to be seen any more except indistinctly at one place, as the wind soon

Laguna Prieta, from the east



In the sand dunes before arriving at Laguna Prieta

obliterates them. Clodomiro told me the cattle were driven by him and his companions from Tinaja de los Papagos in a direct line over the sand dunes, passing the southern point of Sierra del Viejo, to the small pond in Sierra de Lechugilla, but they were too weak to reach the water which is not very accessible. The horses only could get at it, and a détour for water for the cattle had to be made to Tinajas Altas. Six days were consumed by the journey to Laguna Prieta, the majority of the cattle arriving safely, though every day some dropped behind to die from thirst. From sunrise to sunset the cattle walked slowly in single file and scattering to eat wherever grass appeared. A halt was made at night when the men watched them. On a later occasion a hundred remained behind, and at the last undertaking of this kind by other herdsmen, the whole herd was abandoned near Cerro Prieto, most of them finding their way back to Agva Salada.

For the last three miles before reaching Laguna Prieta we crossed the western extremity of the sand dunes, which attain their greatest height here, two or three of the hills being at least two hundred feet high. The lake is at the edge of the big dunes on their southern side, and the comparatively large sheet of water made a pleasing impression. Just as we descended toward it a white coyote was observed running away from the shore. At first sight, we took it for a pelican; my unruly mule prevented me from getting my field-glass quickly enough, but the Mexican who rode behind me saw distinctly that the apparition had four legs. An albino coyote, which was very shy, was once seen near Caborca.

Camp was made on a slightly elevated ground near the shore at the south-west end of the lake. Two large mezquite trees were growing here; they were rather abject looking as they had no leaves, but the guide had seen them with beautiful foliage in the month of May. Laguna Prieta is a salt water lake, but on the marshy shore an abundance of fresh water may be found by digging in the extensive growth of *typha latipholia*, popularly called bulrushes, which are thriving here; the Mexicans call them *tule*. At three places the earth had been dug away so as to make troughs two feet deep, twelve feet long and six feet wide, which were full of clear water. Many years ago, I understand, attempts at cattle raising were made by people from the Colorado River with this water as base for operations. The water, though slightly brackish, does not taste bad, but among the Mexicans of Colonia Lerdo it is reputed to have an ill effect on horses, as some of them when thirsty have been known to die from drinking it.

The lake is half a mile long and slightly less than that distance wide, running from south-west to north-east. Birds from the sea were swimming in the water which, according to the guide, becomes very low in May. The shores are soft and along the south-western part overgrown with bulrushes and reeds, while on the northern part the arrowbush is found. Our mules and horses had had no water to drink for seventy-six hours, so I remained here a day in order to give them a rest.

In the first evening spent here, Thursday, January 27, Venus on nearing the horizon shone with a reddish twinkling or scintillating light. I do not know whether this had been the case for some time or not—perhaps not, for usually in the evenings I cast a few observing glances around the heavens. The following evening the planet on approaching the horizon at three or four degrees assumed this same color which was very noticeable when only a couple of degrees above it.

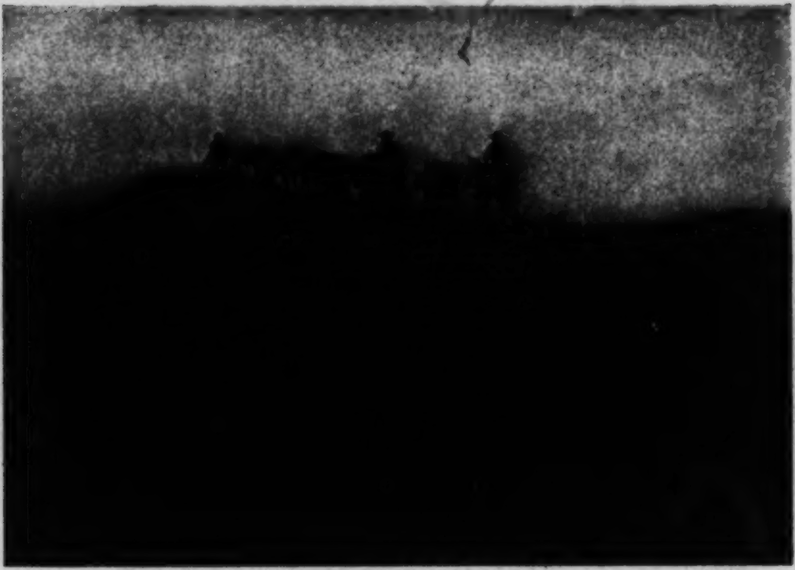
The first day's travel over low sand dunes from Laguna Prieta was rather heavy, and our horses began to give out. Fortunately, as we reached a llano toward sunset, we came upon patches of grass. The only wood available consisted in old stumps of the curious canutillo (*ephedra*) which now made its first appearance. It is one of the lowest types of the flowering plants with only rudimentary flowers, and in spite of its appearance is not related to the pines. On account of much resinous matter which it contains, the plant enjoys a great reputation among Mexicans as a remedy to be taken internally against a certain contagious disease. Fuel resources being rare on the coast, the canutillo is very useful for making fire. It burns lustily for a little while, but as it makes no charcoal, we could not boil beans by it; tortillas, however, may be made with some little trouble. I picked up two long-stalked puff balls (*baltarea*) which were growing in the shade of a chamiso. They were dry, but the sand was moist around the roots, two and a half inches below the surface.

Already at El Capitan we had seen rising in the west a thick column of smoke. The Indians were burning dry reeds, bushes, and old grass along the Colorado

River about thirty-five miles away, and it seemed like a distant greeting. As our party approached the wide bed of the river, a cloud of smoke from the same source again appeared as if it were being emitted by a volcano. We passed through thickets of willows, mezquites, arrow-bushes, etc., and then among marshes covered with bulrushes and reeds. There were also muddy places where the surface had a thin layer of salitre. We found ourselves near the great river which starts in distant Wyoming, at an elevation of ten thousand feet, and, after a tumultuous course of nearly two thousand miles, reaches the sea through Mexican territory. Early in the afternoon we arrived at Colonia Lerdo, a very small Mexican settlement on the lower part of the river. Two miles before reaching this place we had passed a small river, the so-called Rillito Salado, part of the Colorado River, which in May and June becomes so large that boats have to be used for crossing, some of which were lying on the beach.

It was the end of January and the weather was calm, clear, and pleasant with a temperature in the warmest part of the day ranging from 74° to 78° F. in the shade. Every morning before sunrise the sonorous voices of the cranes (*grus*) were heard as flocks of them passed by. Some mosquitoes and flies were about, and during the summer these become a pest. Gnats, trying to get into eyes and ears, are always present here, but they were not very annoying at that time. From April to September is the season when all such obnoxious insects abound. The climate is very wholesome.

Indians burning reeds and grass on the Colorado River



Approaching Laguna Prieta

According to local information, the first settlement here was in 1872. A Mexican company tried to exploit the agricultural possibilities of the region with irrigation, as well as those of a certain fibrous plant (*sesbania macrocarpa*) that grows in the delta. The enterprise came to grief, and an American company which later took the matter up seems to have had no better success. If the information conveyed to me is correct, the notoriously changeable river carried away three colony sites, the first one situated one mile west of the present one, and the second and third were a little nearer to it; the fourth, and present one consists of two ranches belonging in reality to one Mexican family which has survived the various vicissitudes of colonization. They raise cattle, wheat, maize, beans, squashes, and watermelons. The soil is rich and I was told that one sweet potato grown here weighed twenty-five pounds. The inhabitants are Mexicans with the pleasant characteristics of this people. Of late years Sr. Sandoval, the banker of Nogales, had begun to keep cattle on the river fourteen miles below; there were about four hundred head and they seemed to be doing very well. Besides the grama grass, the sacate colorado and the so-called sacate salado, the seeds of which are eaten by the Indians, furnish pasturage. The cattle will also eat the leaves of the chamiso bush as well as those of bulrushes (tule) when green.

It was pleasant to meet at this place an Englishman, Lord Osborne Beauclerk, who, accompanied by the Canadian geologist, Mr. Warburton Pike, had made a boating and sporting trip to the upper part of the Gulf of California. Lord Osborne was a much-travelled man who had visited parts of Asia to shoot mountain-sheep of which sport he had made a specialty. They were on their way back to Yuma, and kindly replenished my depleted larder with rice, sugar, and other articles which were much appreciated.

Only three Indian families were living at Colonia Lerdo, and they had no cultivated fields. They were mostly old people and I found them to be Apache Tontos from Lower California, who intermarry with the Cocopa Indians, only one of whom was present. There was little of interest to be gained from an interview with an old Apache Tonto who lived here with his family. He sold me his bow which is large and made of willow. Among the arrows was one without plumes which is used for killing fish, and with these there was a club of light wood, colored red with ochre, as also a bunch of hawk and heron feathers with a rattle from a rattlesnake attached. Two weeks previously he had killed with a stick twenty large, fat fish which had been entrapped in a waterhole that was evaporating. He had dried the fish which smelled very strongly of rancid oil.

The Cocopa Indians live along the lower part of the Colorado River, nearly all of them within the boundary of Mexico, and plant their crops in the fertile river deposits. The head-quarters were formerly some miles west of Colonia Lerdo, between the Hardie and Colorado Rivers. They are considered by the Mexicans of the Colonia to be well off, raising wheat, maize, the ordinary brown beans as well as the small white beans called tépari, and yúrimuri, black beans. They own wagons and American ploughs and are able to sell some maize and watermelons. Cipriano Dominguez, of Colonia Lerdo, who later served me as guide, in 1900 took a census of the tribe and estimated their number then at one thousand two hundred. Their principal rancherias to-day are, according to him, Noche Buena, where about twenty families live, many of whom seek work at Yuma and return when the river rises to plant crops; Mexical with some forty to fifty families, Pescador with fifteen families, and Pozo Vicente, which is the largest, containing over a hundred families. Formerly they all lived in Noche Buena, Algodones, Pozo Vicente, and La Colonia. According to the same informant, they suffered little damage from the change of the course of the Colorado River, though on account of it many went to Pozo Vicente and over thirty families live in Yuma, working for the Americans.

The Cocopa burn their dead. In case of illness the patient abstains from food and drink. Persons suspected of witchcraft are often killed. The tribal name of these Indians is *Xáwilkunyavæi*, which means: those who live on the river (*xáwil*, river). They are reputed to be very hospitable and, to quote the same informant, "They are the best Indians I know. If a Mexican or American loses his way, these Indians take care of him, give him food, and show him the road." The usual diseases acquired through contact with "civilization" are found in the tribe, and many die from syphilis. Formerly the Cocopa were in constant conflict with the Yuma Indians, but they were friendly with the Apache Tonto, Maricopa, and Papago.

Here our animals had a much-needed rest of four days. One of the horses had to be left, but our mules were all right, and the burros, with one exception, a young animal, were in better condition than at the start. On our return journey along the coast, it was very desirable to secure a guide, but the one man here, Cipriano Dominguez, who knew the coast for some distance, was unfortunately away in Lower California with a party of American sportsmen from the Middle West. It was not possible to wait for his return, which was uncertain, and, even without a guide, I would have attempted to reach Pinacate by a new route rather than return in the same way we had come. As good luck would have it, the man arrived the day before our departure and was at once engaged to go with us as far as he knew the way. Having had to walk the last fifteen miles barefoot, he needed a day in which to recuperate and was to overtake us the next morning, it being easy to follow our tracks in the sandy soil. From my experience on the coast journey from here to Pinacate, I would consider it hazardous to undertake the trip without a guide on account of the extreme difficulty in discovering where there is water. It is known to exist only at certain places, some of which it would have been highly improbable that we should find, in spite of the directions and descriptions given me by the Indian medicine-man in Quitovaquita. Besides water is, as a rule, found on the coast only by digging for it, and there may be no indication of its presence except to one long experienced in finding it. A spade is an essential part of the explorer's outfit for this trip. We saw tracks of a man on horseback who had travelled along close to the beach. He may have been a runaway from justice who, according to the opinions of the Mexicans with me, must have finally perished for lack of water.

In the afternoon a fire started in the dry reeds and grass on the other side of the former bed of the river where our animals were in good pasture, and we were obliged to bring them over to our side. A strong gale from the south-west increased the fire in magnitude and fierceness, and in the evening it threatened to destroy the houses of the Indians, when suddenly a change of wind to a northerly direction brought relief, and the fire died away after a few hours. The Indians no doubt had made it purposely, for they were just at this time busily engaged in such work all along the river, in the usual Indian belief that smoke produces rain and clouds.

CHAPTER XVI

TRAVELLING ALONG THE GULF OF CALIFORNIA—DELIGHTFUL CLIMATE—KILLING A PORPOISE—FISHING—FRESH WATER ON THE BEACH—UNATTRACTIVE DRINKING WATER—FINE VIEWS —A GREAT SALT DEPOSIT—EXTRAORDINARY OCCURRENCE OF SPRINGS—HARD TRAVEL—THE PAPAGO SALT EXPEDITIONS—WORSHIP OF THE SEA

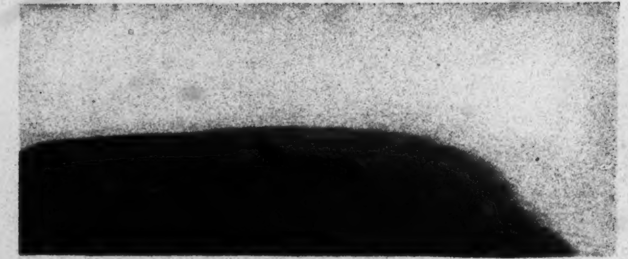
We passed a swamp known locally under the name of El Doctor, where fresh water is found by digging a couple of feet down among the bulrushes. On a low sandy bluff which rises a few feet above the swamp, a jacal had been erected, and near this our guide and his brother once experimented with the agricultural possibilities of the sand, water being carried from the swamp; beans, maize, squashes, and watermelons gave very satisfactory results. The marsh is on the edge of a great playa that runs south-east of the river down to the sea, the eastern limit of the delta. We followed the edge of the playa until we reached the sea, travelling most of the time on high ground and afterward along the bases of desiccated sand cliffs.

Salitre frequently covers small plains of soft soil. There was no trail to follow, though an American automobile from Yuma once tried to reach what is called the "harbor" of Santa Clara. The automobile had to be abandoned at the edge of the playa at a camping place of the same name, the Americans walking thence on foot. From the "harbor" which, according to our guide, is twenty-five feet deep, runs a narrow and shallow inlet or slough, passing the camp of Santa Clara and extending some twenty-five miles beyond, the sea at high tide coming up that far. Before arriving at this camp one may obtain a fine view of some of the river delta by going to the edge of the bluff of sand cliffs which began a few miles east of El Doctor and farther on rises for a hundred feet or more above the playa. The many clumps of bulrushes (*tulares*) observed from there growing down on the great mud-flat near the edges are a curious feature. On account of the action of the wind these isolated clumps of coarse plants look half conical in shape. According to my guide they all contain fresh water. Tracks led to some of them, the cattle having learned that water should be sought here. At the foot of the bluff, before arriving at Santa Clara, there is a spring of tepid water, and the cattle drink this too, though it contains some sulphur.

If my guide is correct, at very high tides the sea washes over most of this playa, which is sixteen miles wide at the mouth of the river, but fresh water may still be found where the bulrushes grow. In digging among them the water at the surface may be salty, but two or three feet lower it is found to be fresh; he said that such is always the case and my own experience on this expedition confirms it. In our camp at Santa Clara on the edge of the playa, it was a novel sight to behold fresh water where the ground all around was covered with a deposit of salitre as white as new fallen snow. There were small salt water lagoons near by, but bulrushes were also growing, and when a hole two and a half feet deep had been made in the sandy mud near the big plants, good water, insignificantly brackish, gradually seeped in. The cachanilla, or arrowbush, is also considered to be a good sign of water.

On the playa were hundreds of coyote tracks. Several robins appeared near our waterhole during the afternoon. Thousands of old sea-shells covered the surface along the lower parts of the sand ridges which were fifteen or twenty feet higher than the playa. I had frequently observed sea-shells through the western part of the desert on the ground at a considerable distance from the coast; they were found to an extent which makes it seem unlikely that they could have been carried there by the Indians. Near La Nariz and at La Salada fragments of *dosinia ponderosa* were encountered.

On reaching the beach we found driftwood lying about in the shape of trunks and branches of cotton-wood and willow, which the river had carried along in its course to the sea. Several specimens of plants in flower were seen on the low sand dunes near the beach, among them *œnothera trichocalyx.* At times we turned off and up onto these low sand-hills, but we were never over a mile from the sea, during the first part of our journey, and usually less. It was the first week of February, and the weather was altogether delightful, remaining almost calm for several days. The temperature was pleasantly warm, from 60° to 70° F. about noon, and at night it would fall as low as 31° F, though it did not feel as cold as that. One afternoon some nimbus clouds appeared in the west



A STRANDED PORPOISE

ROW OF CURLEWS ON THE BEACH

THE DELTA OF THE COLORADO RIVER SHOWING CLUMPS OF BULRUSHES (*Tulares*)

CLAYEY SAND CLIFFS OF THE GULF

against the intensely blue sky; rain fell from some of them, but it evaporated before it reached half-way down to the sea.

Our first camp on the Gulf was made among the sand dunes a few yards from the beach itself. A porpoise had inadvertently become entrapped here as the tide receded, and Alberto, who was with the pack train ahead of me, discovered it splashing near the sea. Actuated by the savage desire to kill everything that is alive, which most human beings have, he approached it and murdered it with a shot from his pistol. The blood, according to his description, spouted forth like a fountain, and one shot was sufficient. When the sun was setting three flocks of cranes passed us flying westward, the last flock numbering about a hundred.

The next day for nearly three miles at a stretch we followed a lovely beach, the ripples of the sea often washing lazily over the horses' hoofs, while a soft breath of air was wafted from the south-west. The big horse of Clodomiro, who rode beside me, stopped often to try to drink from the sea, so he dismounted, unfastened the bridle, and let it judge the water for itself. A great many curlews were walking on the mud-flats and sea-gulls were about, but all seemed to be somewhat on their guard against us. As the tide came in great numbers of fish began to sport at the edge of the water, often jumping out of it, especially around the small rocky promontories.

By common impulse we stopped at a promising place in order to replenish our larder from that wealth of animal life. To be sure, dynamiting is very poor sport, but under such conditions as the present ones, where one could not afford to waste any time in the securing of needed provisions, it seemed permissible to use this rough but ready way. After the small explosions the men eagerly ran out up to their waists and caught with their hands the dead or stupefied fish, throwing them ashore, and one of them gathered big, fat mullets in his straw hat. The result was thirty-one excellent fish, all of the same kind, which provided us with superb food for several days. The upper part of the Gulf abounds in fish. Our new guide told me that on his recent expedition with the Americans he had caught about a thousand fish in one of the ancient stone enclosures of the Indians constructed for this purpose. He repaired the corral and during one night this great number was entrapped. The Americans, however, not wanting so many, threw half of them back into the sea.

Later in the afternoon our animals had a much needed drink from a spring on the beach itself, only a hundred yards from the sand cliffs. Nobody would suspect fresh water here, and its discovery by Cipriano was due to the actions of a coyote excavating to reach it. The water showed no movement and the spring is covered by the tide. In a similar manner fresh water is found on the beach of Puerto de Libertad, to which people from Caborca and Altar go in the early summer. There at low tide the men come with spades to water their animals.

That night we spent behind a low ridge of sand dunes at a place which our guide had named Tornillal, after a number of *tornillos*, screw-bean trees (*prosopis pubescens*), growing there. The screw-beans, which are considered by the Mexicans to have as much nutritive value as oats, are eaten by mules and donkeys, but rarely by horses. The Indians eat them toasted and ground into a pinole. We made camp on a patch of clear level ground which on account of its clayish consistency was cracked with deep furrows. In spite of a light cover of salitre which appeared in many places, there was still among the surrounding sand-hills enough grass for our animals, although in the coast country this was more scarce than before. Quails were running about on the dune back of our camp, and the singing of other birds was heard, but the place was not attractive. The presence of screw-bean trees, at that time without leaves, and of such bushes as the quáviri and the chamiso did not help to relieve the impression of loneliness and desolation of the landscape. The sand people used to camp here on fishing expeditions or on their way to the Colorado River, and I was curious to see where fresh water was to be found. Cipriano pointed out a shallow hole in the dry, clayish soil, under an arrow-bush; there water had been found before, and by digging down four feet deeper we discovered some, but it was unusually repulsive, dark-brown in color though fairly clear, and smelling of sulphuretted hydrogen, very salt, and as bitter as any medicinal mineral water. Its color was possibly due to the screw-beans, as I later on saw the earth black underneath these trees.

It was the worst water used on our expedition; but it did fairly well, with Liebig's extract, which requires much salt, and under the circumstances we were glad to fill our barrels with it. Only one of us was ill for a few days from its effect. We worked our way up to the top of the cliffs, consisting of a clayey calcareous sand, which attain here a height of from one hundred and fifty to two hundred feet, and arrived at a hard sand mesa. A flat, extensive country now presented itself to our view; across it to the north is seen the picturesque Sierra del Rosario among the sand dunes, while in front to the east north-east Pinacate rises dark and gloomy in the distance. To the east are seen two large stretches of sand dunes and also one to the north-east. The vast expanse of land, not quite level, with its stunted growth of bluish-gray chamiso, yellowish-green greasewood, and tufts of green galleta grass reminded me of certain flats one occasionally meets with in the Norwegian highlands. We followed an old Indian track along the edge of the mesa, sometimes passing only a few yards from the steep descent of the sand cliffs to the beach, where two black pelicans were seen. At noon a dense, snow-white fog filled the Gulf, reaching up to our elevation. Above it in the west rose the blue sierra of Lower California, the highest point discernible being San Pedro Mártiro. As the cliffs became lower we again descended to the beach where we camped among the sand dunes. The deep blue sky was clear, but the humidity in the evening was very great, and all our things felt wet. It was pleasant to be lulled to sleep by the sound of the lazy waves against the beach, which awakened, I do not know why, memories of a trip to that charming spot, Bar Harbor, in Maine.

A distance of only three miles inland, but necessitating laborious travel over sand dunes, brought us to the largest salina in that part of the country. As soon as the top of the dunes is reached, a very small one is discovered, about a quarter of a mile in diameter, and near by is an arm of the large one, reaching toward the south-west within a mile and a half from the sea. This salt deposit has sometimes been called Salina Grande, which may be accepted as its name. Surrounded by sand dunes of medium size, it appears to be from twenty to thirty feet above sea-level. It is two miles long at its greatest length, running south-west and north-east, the south-western end being quite narrow. It is three-quarters of a mile wide at its broadest part, and this breadth is maintained for at least half a mile, where the most valuable part of it is. Walking across it, I found the salt hard and beautifully white, and the middle section appeared deep. This salina has been visited by few people, among them Sr. José Y. Tapia, the mining surveyor of Altar, who, as most people, entered from the Pinacate region. He calculated that it contained seven million tons of salt. I understand that a French company, which for some years worked a gold mine, afterward abandoned, near Caborca, also examined this deposit. Much fresh water is present and some day, when railroad communication shall have been established, the Salina Grande will prove to be of great commercial value.

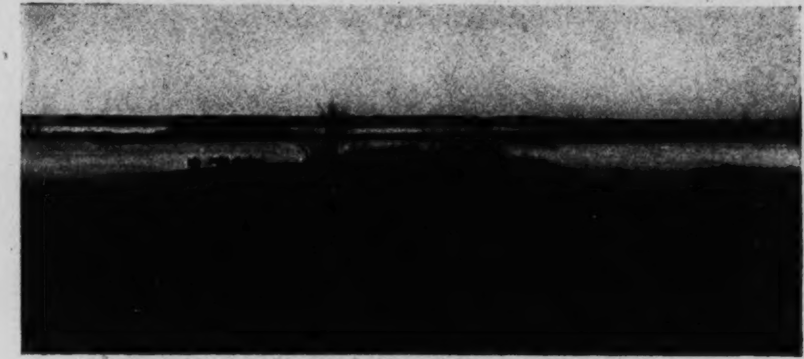
As Cipriano Dominguez did not know the road any further, he returned to his home, and we spent the day here where the animals had good water and a rest, while the interesting physico-geographical conditions of the region occupied my attention. A peculiar feature is the prevalence of fresh water springs on the flat northern shore of the salina; a few of them unite and form a small, gently running stream which disappears into the salt. In the two mornings of our stay herons were standing in line like grenadiers, along this little fresh water flow. The somewhat circular clusters of bulrushes scattered on the northern shore at the widest part of the salina were as usual indications of fresh water, but here the water was in sight. Moreover, it was present in remarkable circular reservoirs of greater or less regularity of shape, the best preserved ones, stripped of their plant growth, resembling small shallow craters, most of which were filled by a hill in the middle.

A rim surrounded the depression about the hill where fresh water is found. Bulrushes covered the little hill and in most cases also the depression, or at least parts of it. The composition of the reservoir was the same as that of the shore or playa—sand with an apparent mixture of clay. These curious springs numbered sixteen; not all equally distinct in their formation, but in the main features their similarity could usually be traced. The Mexicans had the convenient word *pozo* (well, waterhole) for this peculiar formation.

I examined eight of these, all of different sizes and recognizable at a distance by their growths of bulrushes. The one which was nearest the sand dunes and at which we were camped was a hundred feet in diameter; the sand heap in the middle was five feet high, and the rim a foot and a half. The little hill was densely covered with

A pozo at Salina Grande, seen from the east

The rim is plain; most of our animals are standing inside of it. Screwbean trees and bulrushes on the inside hill



The same pozo, seen from the west

Our camp is a few feet from the fresh water of the depression

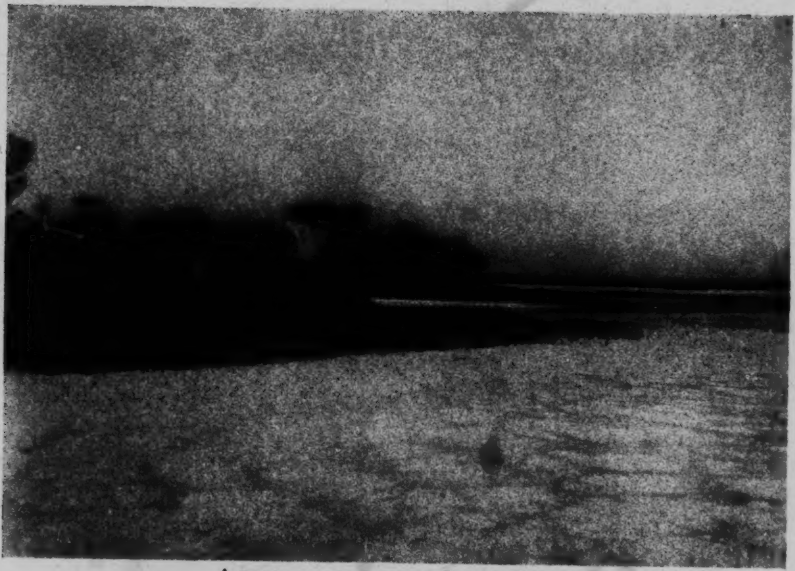
Salina Grande in its northern part, showing many of the pozos or tulares

UofM

bulrushes and the depression also, but to a less extent. An abundance of fresh water, only slightly salt, could be seen among the plants and there was no necessity for using the spade to get at it. Other pozos were twenty feet in diameter, with a depression two feet deep. The largest of them was located a couple of hundred yards from our camp, farther out on the shore or playa. This was about two hundred feet in diameter and had a remarkably regular rim, three-quarters of which rose three feet above the playa, the rest being lower. This contained more water than any of those visited and looked like an overgrown pond; the water here was quite nice to the taste and only negligibly salt.

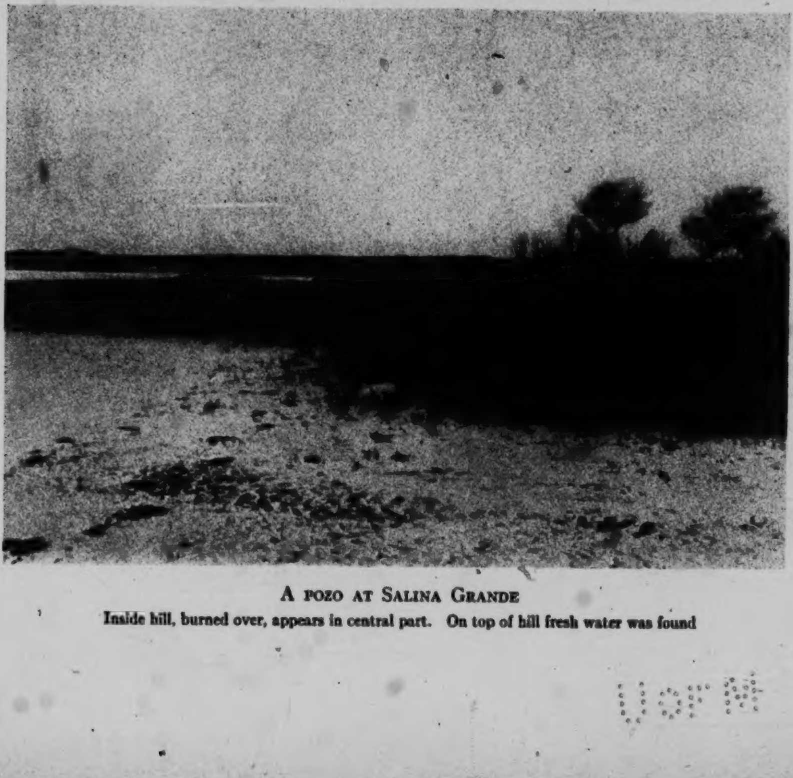
One of these pozos was still further out, actually in the salt bed, where the soft salt cover became more solid, and here the water was perfectly fresh. One small pozo which contained much water had no hill in the middle. An extraordinary feature of these formations was that water actually may be found on top of the sand heap in the middle. Climbing up one of them which was unusually high, about ten feet, I found that a coyote had scratched a hole four feet above the depression, and this was filled with water. The sand on top was mixed with some black vegetable matter and was extremely moist; a small hole I scooped out with my hand was immediately filled with fresh water. I suppose these curious formations in the sandy soil of the shore are due to the action of water that at one time must have been stronger than now. There is no mountain range nearer than the isolated Sierra del Rosario, thirty-five miles to the north. Sand dunes are still characteristic of the country for miles further on. It seems as if the presence of so much fresh water here must presuppose its existence underneath the western area of the desert of the District of Altar and extending perhaps up into southern Arizona.

Besides two kinds of bulrushes (*typha*, in Spanish *tule*), some arrowbushes are found growing over the reservoirs and the latter looked more intensely green than usual. In the depressions grew also the grass called sacâte salado, and sometimes also screw-bean trees, a considerable number of which are present on the north-eastern part of the shore where the little fresh water stream originates. A plant (*anemonopsis californica*) called by the Mexicans *herba del manso* was a singular growth in these pozos. Its large root, which has a strong medicinal scent, like that which characterizes an apothecary shop, is perhaps the most popular of the many favorite remedies of northern Mexico. It is used internally to cure colds, coughs, or indigestion, as well as externally for wounds or swellings, and is employed in a similar way by the Indians. Of the latter, those who lived in the dune country are said to have been in the habit of chewing bits of this root, as elsewhere tobacco is chewed. These plants grew here in great numbers and to enormous proportions; some of their roots were as much as three feet long and very heavy. The root finds a ready sale everywhere and my Mexicans were not long in gathering as many of the plants as they could carry on their animals. One of the men, whose horse was well-



A pozo at the edge of Salina Grande

In the foreground, visible in part, rim, fresh water, and hill. The trees are screwbeans.



A pozo at Salina Grande

Inside hill, burned over, appears in central part. On top of hill fresh water was found

nigh exhausted, walked himself in order to put a load of fifty pounds on his horse.

Animal life seemed scarce here, though two ravens darted repeatedly with angry cries toward my white terrier, as if they wanted to strike him for daring to compete with them in the food market, and he rose each time and snapped at them. Lizards and some species of rodents seem to be the most conspicuous fauna in the dunes.

No one of my party knew the road to the Salina del Pinacate, another smaller salt deposit, where the next water would be found, but as our animals had been in pasture with good water to drink, we felt no anxiety about the journey. It turned out to be extremely fatiguing travel, however, the animals working all the time in the deep, soft sand, up and down the dunes. We followed the crests as much as possible, which were somewhat harder and afforded the best means for progress. It was the heaviest work of the expedition. Usually the dunes formed large, irregular waves of no great height but once, in a limited area, we came across some big ones. We passed some beautiful formations of sand made by the action of the wind, which were like terraces or fortifications extending one above the other.

We camped without water. The next day, about half-way to the salina, as we followed the higher part of the large sand dunes near the slough which under the name of Estero del Tule runs northward, Clodomiro and I came across an old Indian camping place. It was about three hundred yards from the slough, behind some high sand-hills on which a few mezquites were growing. As I stopped to take my bearings we noticed some pieces of wood that had been cut by an axe long ago, an unmistakable sign of human activity. Perhaps this had been done by the lonely Indian of Pinacate mentioned before. Fifty or a hundred yards from there, on a bit of level ground, between the sand-hills, which was covered with large chamiso bushes and sacaton grass, about fifty quails suddenly started forth and enlivened the lonesome landscape with their defiant notes. Shortly afterward we came upon a deep and narrow excavation that led down to water, the existence of which is known only to the Indians and one Mexican who gave it the name of *Pozo del Caballo*, from the skeleton of a horse he found there. Considerable work with a spade would have been necessary to make the water accessible for our animals, and there was no reason to call back our pack train which was in advance of us, so we continued our journey, striking a well-marked Indian trail which leads northward. Small level places were covered with salitre, and the whiteness of the slough, which we followed for six miles, was almost blinding to our eyes.

The slough finally became quite narrow, only twenty yards across, and making many curves and windings. After having passed two of these we found our pack train waiting for us to decide in which direction to proceed. The Pinacate salt deposit, which we were endeavoring to reach, could not now be far off, but neither Clodomiro nor one of the Mexicans who had visited it recognized the locality, having approached it from the direction opposite to that with which they were acquainted. Clodomiro, smarting perhaps under the feeling of having to be guide without—through no fault of his—knowing that part of the country, undertook to direct us and, leaving the slough which now ran easterly, led us up on sand dunes that seemed particularly merciless to our animals after their very hard day's travel. One of the horses had to be left behind after a short time. It was five o'clock in the afternoon, the sun would soon set, and further marching in the dunes seemed aimless. Why not follow the slough that appeared to run in the same direction? There was no time to waste, so following my impulse I led the expedition down to the slough again. A march of an hour more brought us to the salina which we did not recognize at first. It appeared that the very slough we came by was part of it, but, being covered with white salitre, it did not reveal the whereabouts of the salt deposit until, just as darkness set in, we arrived at some shallow water between thin layers of salt, roseate in color.

Our thirsty animals hurried into it, to be sadly disappointed, for it was all salt. A few minutes' further travel along the edges brought to our attention small heaps of earth that had been thrown up on the beach. This was the work of men who had been there to get salt, and we hailed it with delight, for there they had dug for water. To be sure the water was not very fresh, and two of my men as well as two of the mules declined it. However, I knew better water could be found by digging deeper, which at that time we were too tired to do, and I congratulated myself on having saved the expedition from possible disaster. Next morning, by digging six feet deep, fairly good water was procured on the beach of the salt deposit. The two mules which were so particular had been without water for over seventy-two hours.

We spent one day here recuperating and trying to collect the three animals, two of them donkeys, which we had been obliged to leave behind, but in this we were only partially successful. Our horses were in a bad way; these animals, however patient, are not serviceable for such a trip, as they are too fastidious about their food and water. A horse prefers not to eat rather than to try food he does not know. In fact, only two of them reached Sonoita again, and this was accomplished only through the heroic efforts of their owners, one of them walking almost all the time from Colonia Lerdo and the other keeping up his horse's strength with a sack of oats which he had succeeded in securing there. They were large, splendid looking animals at the start, but, as my guide said and as is generally true, "the horse that enters the médanos never comes back." Even my riding mule began to show signs of fatigue.

The salt deposit is at a bend of the slough, and is only about a quarter of a mile long, some two hundred yards broad, and is apparently shallow. The salt is found in layers; along the water edge it is rose-colored and in the central part quite hard and fairly free from impurities. The sea, which is three miles off, is said by the Indians to reach here twice a year. This salina is interesting only because it has from time immemorial yielded the main supply of salt for the Papago Indians, who still come here even from as far away as the Gila River. A few Mexicans also, of outlying places such as Quitovac and Sonoita, obtain this commodity from here. The main route followed by the Indians passes over Quitovaquita, Tinaja del Cuervo, and La Soda, and there is also a trail from the Tinaja del Cuervo direct to Quitovac.

Guadalupe pointed out to me the place where the Indian expeditions camp among the greasewood bushes close to the shore. He also showed me where the Indians, before attempting to gather the salt, had their ceremonial race on the deposit, running four times either forward and backward or one side up and the other down. He himself has been too much with Mexicans to consider any ceremony necessary for fetching salt, but at Chujubabi, where he often lives, he has seen Papagoes pass on their way to another deposit on the coast, called San Jorge, fifty miles from there.

Leaving their horses at the foot of the range of Chujubabi, the Indians would run on foot up the hills, nude but for a cloth around the loins and a ribbon tied around the head. Reaching the top, they would stop in a line all looking toward the distant salt, and every one would make a waving motion with the right hand, from out in toward the chest, one time only, and then they would descend again. The old men are left in charge watching the animals so that they do not drink water until the return of their owners. There is no water from there to San Jorge, the distance being covered by the Indians in a day and a half. This salina, which is said to be only a couple of hundred meters in diameter and at long intervals covered by the sea, is still popular also with many Papagoes north of the boundary line. Their expeditions pass La Nariz, Espuma, and Chujubabi, and the time to go there is in April and October. Sometimes there is no salt found, when those Indians who are in the habit of visiting there come to the Pinacate salina.

The expeditions to the salt deposit, where we had our present camp, used to consist of thirty or forty men—"as many as when going to fight the Apaches," to use the expression of the most prominent leader of these expeditions to-day, whom I met at Santa Rosa in Arizona. In this case, however, they are all unarmed. On the road to and from the salina the Indians eat and drink very little, their only food being pinole, a handful to each, three times a day, eaten in the morning before the start, at noon, and in the afternoon. It is mixed with water, and whatever little may stick to the cup after its contents have been eaten is buried in a hole made in the ground. Nobody drinks water without permission; they wait until the leader tells them to do so, and drink only when told to stop on the march. The party travels very silently, only elderly men who have undertaken the journey before talk, and nobody turns around either on the journey out or on the return. No member of the expedition can scratch himself unless he uses for the purpose a special implement made from a twig of the greasewood.

In the evenings going and coming they receive instructions from the leader concerning the care that must be taken both in the gathering and loading of the salt as well as in ceremonies and sacrifices. They smoke tobacco and they all pray to the sun and the sea for health, long life, and for rain.

Only toward midnight do they go to sleep. The leader carries with him six small sticks, pointed at one end, but without the usual plumes, to deposit in different localities, one in each of the two places where water is found on the long trip, one at an ancient waterhole, one in the salt, one "where the sea used to be," and another is thrown into the sea, which sometimes does not accept it if there is menstruation in the leader's house. He has also three cobs of corn of abnormal growth, flat and deformed and called by the Indians "flat-head corn." The first evening on the road he takes grains from these, four each time, chews them, and then spits into the mouth of every horse to make it strong. Some meal ground from the same kind of corn-cobs is carried along to be sacrificed to the sea.

They arrive early in the day. After having hobbled their horses each man takes off his clothing and places a breech cloth around his loins, and they all walk in a line down to the salt, the leader following, carrying a prayer-stick. Those who have not been there before run four times in the slough over the salt deposit, the others twice. Quite a distance is covered and some do not return until nightfall. When my informant, the old leader, was young, he used to run on such occasions what would be equivalent to sixteen miles. When the race is over every one rubs his chest, arms, legs, face, and hair with salt and then has his handful of pinole, whereupon the salt is spread out to dry. The party next moves down to the sea; going into it up to their knees, each man carries corn-meal in his left hand and, watching for the waves, throws one pinch of it, caught with all fingers, on each of four successive waves. He bends forward when a high one comes lest it might throw him on his back, which is a bad thing as it would make him ill. They do not indulge in any sea bathing, for the ocean is too clean to allow them to soil it, they reverently say.

Toward sunset the salt is gathered in sacks, about one hundred pounds in each, two of these making a load. Great care is taken that no salt be spilled on the road as this would bring about some misfortune. Every one takes back with him a piece of silicious sponge which is found on the beach and which is kept carefully from year to year. This is considered a good remedy for external use. But the leader may take a bite of it, chew it, fill his mouth with water, and spray this through his lips on the men. Members of a salt expedition learn new songs on the trip and they say they dream them while asleep. Among the gifts of the sea may be a beautiful wife, luck in hunting, or swiftness in foot-races. After their return they must stay away from their houses from ten to sixteen days. A good deal of their time is spent in singing to the accompaniment of rasping sticks, and after having taken a bath every fourth day the man is able to join his wife again. According to accounts of fifty years ago* the Papagoes supplied Tucson

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* See California Notes, Fourth Series, in *California Farmer*, 1863.

BEAUTIFUL EFFECTS OF WIND AND SAND, NORTH-WEST OF POZO DEL CABALLO

THE PINACATE SALT DEPOSIT

Papago salt expeditions camp between the two clumps of greasewood to the left and in the middle

and a mining company with thousands of pounds of salt annually. This was undoubtedly brought from this Pinacate deposit. Much of the salt used to be exchanged for wheat with the Pimas.

CHAPTER XVII

A PEACEFUL DAY—TRAGEDY IN THE WILDERNESS—OUR ANIMALS BEGINNING TO GIVE IN—A PROMISING SODA DEPOSIT—LAST CAMP ON THE BEACH—AMONG THE SAND DUNES—SIERRA BLANCA—THE MOUTH OF THE SONOITA RIVER—EL CHARCO—PRONGHORN ANTELOPES—MEETING WITH INDIANS—RETURN TO SONOITA

SATURDAY, February 12, was as peaceful and quiet as any sunny Sabbath day of the wilds. Though the water was yellowish and smelt of sulphur, it furnished me a refreshing "tub." From the top of the sand dunes above my camp there was a fine view of the landscape, which resembled a mountainous country covered with snow. Down among the low sand-hills near the salina three coyotes came along, escaping my camera only on account of the presence of my dog. Never have I seen any other region that harbored so many of them. They evidently foraged on the beach all night long, and in the daytime they would pass in pairs over the salt lake, reminding one of wolves on snow fields. Three of them came up to our kitchen.

Alberto, in looking for a donkey left behind, struck an Indian trail which led straight across the slough that we had followed northward the preceding day, and reported that the ground was fairly hard, except on the edges, where his animals sank up to their bellies. Probably, therefore, we should have arrived more easily by making our way directly across the slough.

Clodomiro and another Mexican, who had been to the coast trying to get fish, brought back a somewhat ghastly souvenir in the shape of a human scapula. On the beach, east of the mouth of the slough of the salina and above the reach of the tide, they had come across an old sailing boat, half buried in the sand. There were remains of red paint on it and the mast was still there intact. Very little sand was inside of it, and here they found the osseous remains of a man, the head missing, remnants of a gray felt hat, pieces of black cloth, a can containing baking powder, and two bottles. They were of the opinion that this man had been an American and that the disaster must have happened perhaps ten years ago.

Our start the next morning was characteristic of the inhospitable region where I found myself. One of the remaining horses was so weak that he had to be helped onto his feet, another horse barely walked without saddle, and my riding mule had diarrhœa. Our progress over the sand dunes was slow and tedious, but after six hours' journey we reached our next destination, La Soda, where fairly good water was found in two shallow holes that had been dug near some bulrushes on the shore of a soda deposit.

La Soda is a deposit of carbonate of soda, one and a half miles long and half a mile wide, running from east to west. The valuable part of it is three-quarters of a mile long and about three hundred yards wide. Low sand dunes separate it from the sea, which is two or three miles off. An American company some years ago started to exploit the deposit, but the attempt was abandoned, perhaps on account of the difficulty of communication, which has to be by sea without there being, as far as I could ascertain, any suitable harbor. Wood for fuel is not found here. For our camp fire we used green chamiso bushes and a bush called *sosa*, a species of *suæda*, the ashes of which are used by Mexicans in the manufacture of soap; the donkeys also eat it.

Mexicans who occasionally pass here on their way to the Pinacate salt deposit usually stop a day to kill fish by dynamite in the sea which is near by. The fish are salted and dried. Several flocks of cranes passed after sunset westward bound, probably for the Colorado River. Some quails and doves were observed and in the morning a mocking-bird sang beautifully, but nothing seemed to be able to dispel the gloomy impression of the landscape.

We started eastward in a chilly northern wind of varying force, which made the atmosphere opaque with sand and salitre, darkening the horizon and hiding even Pinacate from view. As we travelled over an apparently indefinite number of sloughs all covered with a thin layer of salitre, clouds of this stuff would sometimes whirl along and envelop us as if in white smoke. It was a relief to arrive again at the beach which lay before us in a straight line eastward. After a few miles' travel we reached an old Indian camping place, *La Choya*, a translation of the Indian name of the same meaning and derived from clusters of the formidable spiny cacti which is found near by among the low sandy ridges. They seemed to be different from the two or three species comprised under the name choya, smaller and browner in color, and may possibly be another species.

A small low sand dune separated our camp by a hundred yards from the beach. There is little pasture here, and there was nothing from which to make a camp fire except driftwood. Several ocotillos made their familiar appearance on top of the low sand ridges, and near our camp were a few quáviri bushes; some very small chamiso, evidently another species, and some dusky sosa bushes completed the list of conspicuous vegetation here.

There was no doubt about the spot where water was to be found. A large hole had been excavated on the little plain on which we made camp and heaps of earth mixed with thousands of sea-shells had been thrown up, but it must have been some time ago, for there was no water in sight except at the bottom of a deep burrow which had been made at one side by the coyotes. We soon uncovered water, however, but it was strongly brackish.

Four or five miles farther east on the beach two hills loomed up on the horizon and at that distance appeared as two islands, perhaps a mile long each, situated close to the beach. The nearer may be connected with the main-land and is probably a rocky promontory, at least at low water. Sand dunes could plainly be discerned there, and this was where the sand Papagoes used to kill sea lions (in Spanish *lobos*). The other may be accessible from this one at low tide.

From here I turned inland toward the so-called Sierra Blanca, which is south-east of Pinacate, making for a point midway between its southern extension and a row of three large sand dunes that rose at some distance in front of us. Though the air was opaque from floating sand, it often cleared and revealed the picturesque sierra which appeared from the coast much higher than it is in reality. The distance to it is only fifteen miles in a straight line and the landscape presents a vista entirely of sand. For the first two miles the dunes look like large, low waves running in the general direction from north to south. They are each half a mile to a mile long and only from twenty to fifty feet high, and they are smooth looking as less action of the wind is noticeable here. The vegetation is mainly greasewood and canutillo.

For the next four miles the sand ridges were somewhat higher and showed much wind action, as they consist of a great number of small hills, ranging from five to forty feet high, the largest ridges being seventy to eighty feet high. The same vegetation is found on these hills and in addition mezquite trees grow in clumps at the tops, and on account of the absence of leaves looked as if they were dead. It was a pleasant surprise to find in this belt, in the middle of February, a lovely flora consisting mainly of *œnothera trichocalyx* with its large white flowers and also a yellow species. For a couple of miles I saw thousands of them in bunches clothing the small slopes and valleys between the lower sand ridges as if planted in a park. The light green, healthy, and juicy looking plants made me feel as though I had been suddenly transported to other regions less arid than these.

The next three miles contained some sand ridges of smooth appearance, but there were no flowers, though the usual vegetation prevailed.

The last five miles consisted of more or less barren sand-hills, the largest of which had been noticed from the coast running westward like huge waves, each approximately one hundred and seventy-five feet in height and less than a mile in length. These form the beginning of the big bare sand dunes which run in a belt toward Laguna Prieta about three miles wide. We passed to the right of the first one and camped behind it. A stiff wind from the north had been blowing through the day and it felt chilly, although a temperature of 55° F. at sunset was not particularly low; still, as we camped at six o'clock we found it agreeable to draw near the fire.

During the night a fresh gale from the north-west sprang up and filled all my things with sand. For three days it had not been possible to change the films of my cameras on account of the sand that was flying about. It worked its way disagreeably into rifles and instruments, but did not do any damage, as it was clean and easily shaken out. Clodomiro and I had followed an hour or less after the rest of the party and we had occasion to observe how astonishingly quickly a wind of even moderate force obliterates tracks.

Emerging from the dunes, one is suddenly confronted at their edge with a full view of Sierra Blanca which, as its name implies, is of a very light granite color; the Indians too, in their language, call it the "white range." A huge lava flow from Pinacate separates it from the dunes and follows it almost to its southern point. Isolated specimens of the white brittle bush grew in great numbers over the dark sheet of lava in front of us, giving at first sight the impression of being spots of ashes on a large field of burnt grass. We had last seen this bush at El Capitan. All along the base of the sierra there appears a narrow strip of verdure, consisting of palo verde, palo fierro, and the usual vegetation of such localities. A lonely sahuaro, the first seen since leaving the Gila Range, stood on a hill-top. Though no water is found on the western side of Sierra Blanca, the vegetation of the standy strip along the base of the range sheltered by the lava flow is luxuriant. Close to my tent toloache (*datura*) was in flower, and a creeper with lots of small leaves that smelled like mint when crushed attracted unusual attention from our animals.

There was an abundance of grass here, but our animals had to be taken to water twelve miles away at Tinaja del Cuervo. Accompanied by Clodomiro, I examined this small and steep mountain range, which has not before been explored, ascending it in three places; its height is only about one thousand five hundred feet above the llano, and its crest is as narrow as any of those in that western region; a stone can be thrown from one side to the other of the ridge. The mountain-sheep have a well-beaten path along the entire crest, although it would be difficult for a man to pass over the middle section. We saw a gray fox in its lair near the top.

Loose rocks and stones, which in a time long past had tumbled down from above, fill the gorges or arroyos that descend from the sierra. No soil is in sight here and it is almost incredible that any plant life could strike root, but, in spite of this, whatever grows is in a thriving condition. The steep gorges were filled with a pleasant aroma from the brittle bush and sangrengado, and the ocotillo was in evidence in the lower parts, all serving as food for the always fat-looking mountain-sheep. Also a few greasewoods, choyas, and century plants are seen here and there among the mountains, which, however, impress one as being barren of vegetation, except in the arroyos, and such is the case with all sierras of the desert region.

Standing on top of the southern part of the sierra, one sees toward the north and the east a large llano with greasewood growth that extends as far as the low sierras of Agua Salada. Sierra de San Francisco, nearly twenty-five miles across, is directly opposite us, and to the east Sierra Pinta, perhaps eighteen miles away, looms up. There are no sand dunes to interrupt the flatness of this llano; the ground is hard and easy to travel over and the soil is good for agricultural purposes.

The most interesting sight from this lofty point of vantage was the course of the Sonoita River, which even to the naked eye is conspicuous on account of the green growth of mezquites that follow its banks. It is unnecessary to recall the fact that most of what is called the Sonoita River has no water except immediately after heavy showers. It has been supposed that the Sonoita River never reaches the sea, but I may state here that such is not the case, as it does occasionally carry its capricious waters to the Gulf. Through my field-glass I could make out distinctly its course as it passes a couple of miles this side of some isolated small hills, *Los Cerritos del Rio*, which were conspicuous on the large llano to the east south-east of us, about twelve miles away. Galleta grass grew between the hills and the river, which runs south from there for about four miles and then makes a curve south-east continuing for about two miles more. Although I could not actually follow it to its mouth, still for many miles south-eastward and south its course was easily traceable, and without doubt it reaches the sea, which was visible in the horizon. Moreover, my guide, Clodomiro Lopez, who during the expedition had proved himself to be reliable, had been on the river in February of the preceding year at only one league's distance from the Gulf. An unusual amount of rain had fallen and at that place the river-bed ran full. The bed of the river was deeper than at Los Pozitos but not so wide and mezquites were growing on the banks. The mouth of the river should be about four leagues west of the terminal of the little railroad of the Sierra Pinta mine.

While the gravelly land stretching along the base of the Sierra Blanca presents the usual smooth appearance and vegetation, there may be observed farther away on the plains sandy patches covered with galleta and sacaton grass. Toward the south and the west at some distance are seen green and yellowish patches, due to the colors of flowers, for the soil is rich there. Nearer, scarcely two miles off, is a small plain which presents the same coloring in its southern part, while it is red in its northern part, due to the prevalence of the golondrina. It is a small sandy basin running east and west into which many streams of rain-water disappear, and hence it is called by my guide El Charco. The Pinacate lava flow reaches that far.

On a visit to that locality I found that the most conspicuous plants were the prickly poppy, in Spanish *cardo* (*argemone intermedia*), *sphæralcea incana*, a nightshade (*physalis lobata*), *nama stenophyllum*, and *plantago fastigiata*. The latter, which the Mexicans call *la pastora*, is considered to be the best kind of pasture. Its seeds are eaten by the Papago Indians, either uncooked or toasted and ground to a pinole. These several species of plants were all in flower. A pair of blue birds were near and in one place one of them kept flapping its wings over the white flowers of a poppy plant. A falcon also made its appearance here and hawks, as usual, were much in evidence.

At the base of the sierra we startled a flock of ten mountain-sheep resting at noon in a small arroyo. Most of them ran swiftly up the mountain sides, but an old ram took the situation more calmly and walked leisurely behind the rest. As we rode on, keeping our eyes on the craggy ridges that extended from the summit, the ram was seen again on top of one of them. His head appeared against the sky over three hundred yards off; he stood there for five minutes looking at us, immovably as in a picture, the rocks on either side of him forming the frame. I was going to put up my tripod and take a time exposure when he slowly walked off, following the crest upward.

Just as I was about to mount my mule he suddenly came dashing down the steep slope toward us, as if to ascertain what we were doing there; at one-third of the distance down he turned, however, and trotted swiftly and easily along the steep and broken slope of the mountains, exposing his side to the camera. We saw him again in another direction, nearer to us, but high up against the sky, where he stood for a few seconds and then turned his white tail toward us and disappeared.

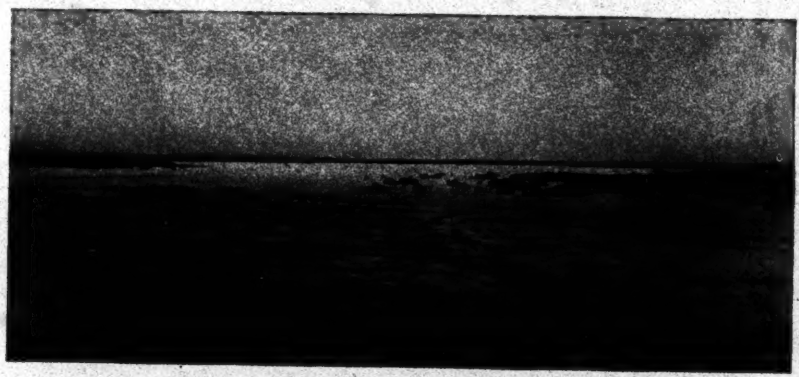
Five of those beautiful swift animals, called pronghorn antelopes (*antilocapra americana mexicana*), were also seen grazing at about three hundred yards out on the llano. When these animals move among the greasewoods alone, they are easily discovered on account of their color, which, while mainly light reddish brown, presents a good deal of white, the legs and under body being thus marked, but the rest of the vegetation here offers them much protection. The extravagant shape of the choya, combined with its whitish color, often suggests an antelope at a distance, and there are many old crags and withered branches that look like prongs or horns. The large open llano, the favorite haunt of these animals, is in places covered with the golondrina and another taller plant, both of a reddish hue, which resembles that of the antelope. As I was dressed in white, I succeeded in approaching them, but they are much more shy than mountain-sheep, and they suddenly, although within easy reach of my rifle, became alarmed at my photographic efforts. They trotted away quickly in single file, describing long serpentine curves among the greasewood.

Clodomiro and I made a circuitous route around Sierra Blanca, overtaking the pack train late in the evening at our former camp Galletal. My riding mule had had no water for seventy-eight hours. The next day I began to retreat to Sonoita in order to replenish our store of provisions. In the afternoon, as we travelled along, we noticed a cloud of dust rising from the llano ahead of us, a sign of travellers coming our way. They proved to be three Indians from Barajita, a rancheria in Arizona, on their way to the Pinacate salina. Their pack animals carried little else but empty packing nets, as the provisions brought along on salt expeditions are meagre and of only one kind. They asked about water and grass. One of them said he knew that we had started for these parts two months ago.

The leader wore a fantastic white hat with a bluish plume waving from the centre. The second was an elderly, cunning-looking man, who dismounted and offered his hand; the third was fat and more civilized looking, known by the name of José Juan and as a prominent medicine-man. He is usually *capitan*, but this time he was probably not, as he came last. The capitan leads going out and is the last in the procession coming back. They seemed intelligent and it was strange to find some natives of the desert after having beheld for so long only their haunts of former days. They maintained a kind but reserved mien and departed after a minute or two of conversation. I gave one of them the cigarettes I had with me, and he asked for matches which were promptly supplied. Their animals were in good condition and though the sun was low, they would reach the Cuervo tank, seven miles off, in a very short time, Clodomiro said. Half an hour later we saw from the dust in the distance that they were nearing their destination.

We camped that night on the bank of the Sonoita river-bed, which is much larger here than in Sonoita, thirteen miles south of Agua Dulce; it is about one hundred and twenty feet wide and runs in two sections, separated by a low narrow ridge, each part about fifty feet wide. It is rather surprising that a river which carries water for only a few hours at a time can leave so large a course. At certain bends of the river where the sand contains clay the water may last two days. There were mezquites of considerable size here, and it was pleasant to see them again, as it meant wood for our fire. A couple of miles before arriving at Los Pozitos we passed a low ridge where pieces of obsidian lay scattered about. If my guide is correct, this is the only place where obsidian occurs in the country south-west of Sonoita. Two miles from Los Pozitos a number of sea-shells of various kinds were observed about six feet above the river-bed.

The little stream of crystal clear spring water at Quitovaquita is smaller than a brook, but it seemed much alive as it hurried on in its effort to keep the dam full. As I had been long unaccustomed to seeing running water, and for twenty days had drunk it more or less brackish, the tiny brook seemed almost unreal and was enchanting in its effect. It was also a delight to



Leaving La Soda

Sierra Blanca, southern part, seen from the south

Waiting for his chance. At Los Pozitos

indulge in my first real wash for nine days, for I could hardly count to my credit the fact that my finger-tips were cleaned morning and evening when washing my cup and spoon with a little of our precious fluid.

As for provisions, meat we had not eaten since our departure from the Colorado River, except for the first few days, and it is difficult to keep a Mexican contented without it, though the delicious mullets caught had helped us out immensely; flour we had had to economize much, and for the previous four or five days there had been an actual shortage; we had enough rice, coffee, sugar, but our main standby was tĕpari, the small white beans of the Sonora Indian and Mexican. The extent of their cultivation in Mexico I do not know, for I have not seen them outside of Sonora. I cannot myself too strongly recommend them for regions suitable to them. While the ordinary white beans have little flavor of their own, these tĕpari have quite a strong and very pleasant one, and even the water in which they are cooked makes an agreeable sauce. They contain much fat in themselves and they cook in a short time, which is another great advantage.

The next day I arrived at Sonoita with a feeling of satisfaction in having successfully accomplished the first half of my exploration of the desert south-west of that place. It was toward the end of February and springtime greeted us in the oasis. Already at a distance the attractive light green color of the cotton-wood trees (Spanish, *alamo*) and willows were evident, the new leaves being half-grown; peach, apple, and almond trees were in bloom, and the verdure of the wheat-fields among the Indian houses was pleasing to the eye.

Sr. Isauro Quiroz received us with whole-souled heartiness and invited the whole expedition to a meal in his house, Guadalupe sitting down at the table afterward, for there was not room enough for all at the same time in the hospitable little dining-room. The fresh eggs tasted delicious, and I felt as if I had arrived in civilization again, for everything is relative in this world.

CHAPTER XVIII

NEW EXPEDITION WESTWARD—GROWLER WELL—A HARDY OLD PAPAGO—DISAGREEABLE EXPERIENCE WITH A MEXICAN OF MY PARTY—A VALUABLE NEW MEMBER—PAPAGO LOYALTY—PRONGHORN ANTELOPE AGAIN—MOUNTAIN-SHEEP INSIDE OF A CRATER—I LEAVE MY MAIN CAMP—MY TWO COMPANIONS—RISKS TAKEN BY THE PROSPECTOR—DECEPTIVE ATMOSPHERE—OUR GUIDING STAR—READING TRACKS—SOLITUDE—BEAUTY OF THE DESERT

On our first day in Sonoita a fresh south-westerly breeze which later changed to northerly made it impossible to start the patient burros grinding for us in the flour mills, but the following days were spent busily preparing for the new expedition, and on Thursday, March 3, I was able to start again westward. My principal object was to reach Sierra del Rosario, around which I had travelled at a distance without having found a visit practicable. Sr. Isauro Quiroz insisted that no white man had ever been there, but however that may be, it is certain that nobody from Sonoita or Colonia Lerdo had ever gone there. By taking different routes from those I had followed before, I expected to be able to complete my knowledge of the desert.

My first objective point was Quitovaquita, where this time I hoped to have better success in inducing old Pancho, the medicine-man, to go with me. His daughter, whose illness on the occasion of my first visit had then prevented him from accepting my invitation, had died since. We found the place deserted, but the cattle of the Indians were still being watered at the dam, and through the herders we were informed of the whereabouts of the owners, who had moved to a camp called El Pozo, which was at no great distance. We accordingly followed them and made our camp at the same place. As nothing can be accomplished in a hurry with Indians, I improved the occasion by taking a trip farther up in Arizona to Bates's Well, or El Veit, as the Mexicans name that locality, and which is now curiously called the Growler Well. There is a copper mine here, but work on it has been suspended, and the place is inhabited by very few people. An American who was in charge of the mine and the store received me hospitably. He invited me to a square meal or two, presented me with some copies of magazines and recent newspapers, and, above all, helped me out with a new supply of rope for my outfit, of which I was sadly in need.

The news of the day was that a week ago an American had been found dead on the playa north of Pinacate. Caravajales, the Indian hermit of Los Papagos tank, had come across the body which had been badly used by the coyotes, and a black jacket had been found hanging in a tree near by. Another report was brought to me that the "professor," meaning myself, had also died from thirst, and that the coyotes had dragged away his head. This last confused rumor probably related to the human remains found in a boat by members of my party.

At this place there lives a very old Papago, José Juan, father of a restless, unapproachable Indian called Agustin. The man is reputed to be one hundred and fifteen years old, and he certainly looked as if he might have reached at least a hundred. As we entered his house he rose to a sitting position, but was short of breath and could not talk much to us, he said, owing to a recent accident while drunk. Considering that the old man had been intoxicated on the white man's brandy for three days, the state of his health was certainly wonderful. He had all his mental faculties intact, and was one of those who after a sufficiently long acquaintance might give a good deal of truthful information. According to him, the sand Papagoes often camped in the winter-time at Sierra Blanca. The Apaches in their raids used to go as far as that mountain range. There was rain formerly every year, but it was no longer so, he said. He spoke of some big bones he had seen among the great sand dunes, and in regard to the ruins of a mission in the western desert, rumors of which are current among the Mexicans, he said he knew nothing about them, though he had spent most of his life among the dunes. He also professed ignorance concerning the existence of a smaller salt water lagoon east of Laguna Prieta; however, it is doubtful whether he wanted to tell the truth about this.

In regard to his son Agustin's silver mine, of which both Indians and Mexicans have much to relate, including the oft-told tale of pure silver being melted by mistake for the making of bullets, he was less reserved, and said that it was on top of the Cabeza Prieta range, not far from the tinaja in the same direction as we travelled, which would be west of it. He demanded *kok peso*, two dollars, for permission to photograph him.

On my return to El Pozo I had a disagreeable experience with a Mexican in my party owing to the story of the dead American on the playa. The report might or might not be true, such tragedies are by no means unknown in the desert, but this one had an entirely unexpected effect on the man, who was otherwise intelligent and useful though shifty. He was not afraid of the corpse to be sure, but connected the tragic occurrence with two Mexicans who just before our start had passed through Sonoita, on their way westward to Tinajas Altas. As travellers in that part of the country are very rare, the people of Sonoita always wonder what their business may be, and sometimes they are suspicious of them. The two men were from Douglas, Arizona, and had not found it expedient to inform anybody concerning the exact aim of their journey. In fact, although they looked all right, they had aroused some suspicion in my Mexican by giving various accounts about their destination. He immediately jumped to the conclusion that these two men had something to do with the dead, and in the presence of all said to me: "You carry much money and had better go by another route; I am not going to stand by you; I will run away on my mare."

"Well, I am going to persevere, and I know the Papagoes will," I calmly answered. "I am glad you gave me notice beforehand, but you will have no occasion to do as you intend," I added.

He then addressed the Papagoes to get them to agree with him, but they gave no answer, and only smiled.

"You know I carry little money, and I do not care whether I lose the little I have; my note-books interest me much more," I thought it expedient to interject.

"The books do not interest us, do they?" he again addressed the Papagoes, who remained silent. It was very satisfactory to see them standing with me as firm as a wall. As I walked away I heard him saying to Guadalupe, "Really there is something in this; we ought not to expose ourselves to danger in this way," and again there was no answer. How disagreeable it is to discover that a man is morally and physically a coward. The next morning, before our start, he sat mending the cover of one of my three large canteens. "I am doing good work," he said; "a canteen will prove very important yonder. In the desert a man would see the mouth of my rifle barrel rather than that of my canteen," meaning thereby that he would rather give a bullet from his rifle than water from his canteen. In other ways he had some good qualities; he was honest to the core, and was a very serviceable cook. Discharging him was out of the question; his services were indispensable to the success of the expedition, for in that country men are scarce or not to be had, and any delay would have been fatal on account of the approaching hot season.

Pancho, the old medicine-man, was induced to go with us, but in the morning as we were starting he came to inform me that his donkey could not be found. Surely, if it did not come, he would not be able to accompany us, and I was afraid that this might be a scheme of his wife to prevent him from going with us. But he was too important a man for me to allow him to fail us, so I sent word to the pack train, which had started already, to stop, and I remained myself. An hour later, to my delight, he came trotting briskly along on his small donkey.

Our first camp was made at La Papaga gold mine, near the border, which is not being worked, but where a good artesian well has been made. It is over a hundred feet to the water, which is said to be more than that number of feet deep, and it took two hours to water our animals. Some American prospectors were camped here. One party of them had just come in from the west and reported that there was no water in the Tule well, which lay on our proposed route. By digging in the sand they had managed to get some for their animals, though it was very bad and ill-smelling. They spoke of having met some suspicious looking Mexicans at Tinajas Altas who seemed destitute of everything except arms and full cartridge belts, and were very non-committal in regard to their errand. The Americans had even been led to believe that they were waiting to meet me, and had given them some provisions. Another party of two Americans, who were prospecting in the neighborhood of La Papaga, had just brought in provisions from Ajo, as well as some more details of the story of the dead man on the playa. All this was too much for my impulsive Mexican who declared he would not go. "If you go, you will have no *arrieros* (muleteers or packers) with you!" he exclaimed.

I came to the conclusion that it was best to ensure myself against further thoughtless and cowardly remarks by leaving their author behind—not here, however, but in the Pinacate region. I resolved to go to Tinaja de los

Papagos and establish a main camp there from which with two Indians I would make the intended expedition alone. I was pleasantly surprised when early next morning Guadalupe, as spokesman for the Indians, came to me in my tent and said: "Listen, Don Carlos, that is not right. We will go with you. It is for this that we are here." I suggested that it was not worth while to pay attention to the Mexican. "We did," he said, "and it did not appear to us right to talk like that." I thanked him for this and he walked off looking for his burros.

Old Doctor Pancho, of small stature and riding a small burro, led the way. As we were riding between some low hills he suddenly showed animation, pointing out fresh tracks of mountain-sheep. While we halted, Pedro, a Papago who is an excellent shot, climbed up one of the hills, while our Mexican, who was also a successful hunter, set out to investigate the tracks, galloping around the hills. Soon two shots were heard from Pedro, who was running fast along the ridge; two sheep ran in front of him, both evidently wounded, for he threw stones after them in his anger. One fell and the other continued its flight, pursued by more shots. It made its way toward us and stopped, paralyzed in its hind legs, as it had been shot in the spine. A third one had been wounded and, as I did not like to go without putting it out of its suffering, I decided to remain here over night.

The locality was quite attractive with much pasture and an abundance of palo fierro. There was general contentment in camp since the always vexing problem of *carne* had been solved so quickly and easily. The evening was agreeably warm, 70° F. at seven o'clock, and a soft breeze was blowing from the north-east and sometimes from the south, obliging me to be continually changing my seat at the fire in order to avoid the smoke while I was toasting my tortillas. The following day, in the morning, Pedro returned with the third sheep. They were all young females and the skin of the youngest was preserved.

After having travelled across a large plain, part of which is called La Playa and presents the unusual spectacle of greasewoods that are sickly looking, small, and growing close together, we passed Monument 180 standing like an outpost on the great lava flow of Pinacate. We then made for Tinaja de los Papagos, which, on account of malpais, cannot be reached by a direct line. As we were passing the rim of a great crater, only five or six miles from our destination, we discovered two antelopes among the desert vegetation, standing motionless at about one hundred and fifty yards distant and looking at us. We halted and Pedro was dispatched to try to secure them. Unfortunately, one antelope was only wounded, one of its forelegs being broken near the shoulder, and this did not prevent it from running extremely fast on its three remaining legs. In spite of a most zealous chase for hours the next morning, it showed as much agility as if nothing had happened to it, and finally the pursuit had to be given up.

Our animals after forty-eight hours without water were glad to drink; the work had not been hard and the heat of the last days was never greater than 86° F. in the shade. At the tank in the evening pigeons by the hundreds were still in evidence, and two or three shots from my gun furnished me with delicious food for several days.

I was desirous of getting some photographs of the mountain-sheep by visiting the neighboring crater again, as perchance some might have found their way into it this time. As we went toward our two previously assigned places nearly half-way down, the noise from the cinders in which we were sliding started out a mountain-sheep at the bottom of the ample crater. He came running out of the large talus to the llano below and seemed very shy.

We took up our different positions and Pedro, much against his inclination, was ordered to descend the three or four hundred feet that remained in order to startle the animal so that he would come up and pass before the camera. The effect of Pedro's arrival at the bottom was to make the sheep ascend the talus, just opposite to where I was seated. It then ran swiftly and sideways across the accumulation of rocks as easily as a horse gallops over a plain. According to Mexican accounts the mountain-sheep is at a disadvantage on level country, and a galloping horse easily overtakes it, but among the loose rocks he showed his agility to the best advantage. Approaching in this manner the place where the first exit was possible, the *toro* (ram) suddenly stopped some one hundred and fifty yards from the man who was watching there. He stood quietly for fully ten minutes when I asked Guadalupe, who was placed not far from me, to fire a shot from his rifle to start him again. The sound, with its reverberating echoes, had the desired effect, and the animal resumed its circling of the crater, this time lowering its course somewhat and stopping now and then as if uncertain which way to go and how to defeat the enemies' designs.

A knoll soon hid the sheep from view and made it impossible for me to follow him, though I expected soon to see him emerge and pass my stand. Suddenly the man at the other station shouted: "*Arriba!*" (Higher up!). The animal had taken an unexpected route, and I made as fast as I could for the top of the knoll, just in time to catch him at forty yards' distance as he stood wavering for a few seconds before continuing his flight to the upper part of the crater. Swiftly he scaled the slippery cinders in a straight line for the rim, and then my men, who in the meantime had contained themselves with difficulty, were allowed to fire, but the distances were considerable and the animal easily made his escape.

On Tuesday, March 15, I left my camp to make the intended exploration of the sand dune country west of there. I was accompanied only by two Indians, Pedro and the old medicine-man, Pancho, both belonging to the sand people, the latter being one of the few left who had actually lived there. He spoke no Spanish nor English and was not particularly distinguished by any profound knowledge of the art of travel, but he was businesslike in his silent ways and reliable, though extremely sensitive and apt to imagine a cause of offence where none had been given. Pedro spoke Spanish, was an efficient packer, could make tortillas, and was a good all-round man, quick in his actions but often careless.

He was unusually intelligent, though of an unpleasant, uneven temper. We had selected the best animals, all burros, with the exception of my riding mule, and took along only the most necessary things, leaving my tent and cot behind. Water would be scarce on the road, so we filled our large canteens in addition to the barrels, which usually furnished us with water for three days. I was glad to be off, and felt free and ready for action.

The Indians on their trips from Los Papagos to Tinajas Altas used to go through the pass between Sierra del Tuseral and Sierra Nina. I chose an unusual route, skirting the latter's southernmost point, which is a more laborious one on account of sand dunes to be crossed there. A dry arroyo passes between this point and a high wall of sand dunes and then runs west for a very short distance before it is lost in the sand. Our animals worked well with the exception of the "doctor's" little burro, which did not like the trip, but later mended its ways.

It was somewhat surprising to find that the waves of the large sand dunes reached quite up to the foot of the south-western part of the Sierra Nina. While looking for a camping place here, I met with the startling sight of a pair of blue overalls, quite new looking, lying among the dunes, and a few yards farther I came across a red woven blanket of poor quality. The Indians both declared without hesitation that they had belonged to "Melicano" (an American). No place seems deterrent to the prospector; he is lured farther and farther away, for what he is looking for may be found just in some lonely hill that looms up before his eyes among the sand dunes. He throws all caution to the winds and only on his return does the water question become serious to him. This one probably had attached some hope of water to the dry arroyo which is here covered with sand but is traceable among the dunes by the experienced eye. His senses became bewildered and the last stage of suffering from thirst had probably been reached when he began to throw off his clothes; such would be the account of all those who know the desert. When we made our camp near some palo fierro trees, Pedro told me that Doctor Pancho had taken possession of the red blanket. It was a ghastly relic to carry along, so I offered him two pesos (dollars) to leave it behind, to which he readily consented, laughing at the same time in his quiet way.

The sand dunes, which seemed eternal, were found the next morning to be at this point a small branch from the main body, running in waves from south-west to north-east, and they were only a mile and a half across. After passing them we travelled over hard, gravelly soil; on my left, south-westward, as we followed Sierra Nina to its end, was spread before my eyes a vast expanse of llanos and sand dunes, with Sierra del Viejo running into it from a northern direction, and mountain tops appearing here and there—a lonely vista, but not depressing.

It is well known that the clear air of the desert exaggerates detail and makes distant objects look near; this, of course, is undeniable, but the opposite seems equally true, for distant objects, such as mountains, again and again, appear farther away and much larger than they are in reality. The sierras of the desert look impressively large at a distance of from ten to fifteen miles, but, on approaching them, it is found to be a small matter to scale them, as they may rise above the plains only one or two thousand feet. The afternoon of the preceding day I had a striking example of this deception after having gone through a very small pass in the southernmost part of Sierra Nina; the pass itself could not have been more than fifteen or twenty feet above the surface, and the knoll, which was thus separated from the main range, could not have been over fifty feet high, still, three-quarters of a mile farther on, in looking back at the little pass, the knoll and the range looked very much larger and higher, and, in fact, from my point of view, which was lower, they made quite an impressive appearance among the dunes.

We struck the old Indian trail alluded to above, which, however, is indistinct and difficult to follow near the base of Sierra de la Lechugilla. Our animals all seemed very determined to wend their way back again to Los Papagos; this was our second day out and, being thirsty, they were likely to stray, so under conditions such as these, where water is found at such great intervals, it is imperative to hobble the animals very carefully for the night in order to secure against their loss, which might be fatal to the expedition. "We are going to watch them until the moon sets," said Pedro, but he was kept busy all through the night turning them back, and one of them, my riding mule, had finally to be tied. In this way they had little to eat and in the morning the burros overran our "kitchen," putting their noses into our boxes and trying to bite holes in our flour bags; they also attempted to remove the plugs from the water barrels.

As usual, we had begun the day in darkness. Our way of knowing the time for rising was from the height of the planet Venus above the horizon, her approximate position being pointed out in the sky the evening before. We managed to get an early start in order to reach Tinajas Altas in good time, for this was our third day without water. The picturesque tree, ocotillo (*fouquieria splendens*), was noticeable everywhere growing in great profusion on the gravelly soil. Its magnificent vermilion-red flowers growing in tufts at the end of slender branches which emerge from a subterranean stem, in the manner of a bouquet, looked splendid against the sombre gray background of the sierras. The flowers appear before the leaves and on some of these plants the leaves were beginning to show. Also a good many species of cacti were observed, two of them with reddish flowers. It is curious that in the wide area along the coast south and west of Sierra de Lechugilla, Gila Range, Pinacate, and Sierra Blanca, cacti are so rare that they almost disappear.

We travelled at a good steady pace along the weatherworn northern end of Sierra de la Lechugilla. In a thicket of a dry arroyo I tried to take some snapshots of a quail which exposed itself temptingly to my photographic inclinations, and thus I fell ten or fifteen minutes behind my men. There were many thickets along the sandy arroyo in which their tracks were very easy to follow. As my party was so close ahead of me, I did not pay much attention to the quality of the tracks that after a while were found to lead across the arroyo toward a valley in the northern end of the sierra. Perhaps my men had made a détour to see if there were water in the small tinaja which Clodomiro Lopez had discovered there, and which could not be so very far away. A little farther along I made out fresh tracks of nailed boots; horses had passed as well as burros and, as the man evidently had returned the same way he had gone, it was difficult to distinguish the tracks I was following. I had to cut across the bottom of the valley to make more sure of what I saw and it became quite plain that two horses, three burros, and one mule had passed here and that, consequently, my party had followed another course, so I returned to the arroyo and took the right tracks up again.

My mule not having eaten anything the previous night, and having sweat much the day before, was worn out, and I had walked on foot for an hour and a half, dragging my animal along, when the footprints I followed halted at a long, low ridge, bare and stony; here, too, the man with the nailed boots and his animals appeared again making confusion. I was not lost, for my "bump of locality" is well developed, and there is nothing to fear under circumstances like these if one keeps one's head cool. The only thing to do was to make a large circle of the country to cut the tracks, as the expression goes, but it was vexatious, nevertheless, to have all this trouble. My Indians had hurried along, of course, for the sake of their animals, and it would never occur to them that I should have any difficulty in following them. I did not know how far away Tinajas Altas was, but once on their tracks it would be easy to find; daylight was essential for this, but even if I should have to stay out for the night, it would not be any great misfortune, for I had plenty of water in my canteen. The weather was rather sultry and there were cirrus and cirro-cumulus clouds which sometimes hid the sun from view, but it did not feel warm, as a soft breeze from the north-west was blowing.

Having made sure that my men had travelled in no other direction, I returned to the low stony ridge, and by a careful examination I found that stones had been scratched or turned over, indicating the way they had passed. They had followed the crest of the ridge for a couple of hundred yards, then descended, making for the range of the Tinajas Altas. I followed their tracks up to a mile's distance from the range, then I knew I was right, so I directed my steps to a fresh looking palo fierro for a short and well-earned rest in its grateful though scanty shade before continuing my journey. My mule took to the green leaves of this attractive desert tree, while I had a frugal lunch of toasted wheat and some California dried prunes.

In my meandering course that day I had come across many tracks of which the most conspicuous were those of the wagons employed fourteen years ago by the International Boundary Commission, and which in countries other than arid might have been judged a few months old.

They had had a camp somewhere between the two sierras and water was brought from Tinajas Altas. Tracks left by human activity in a solitary region like this are disturbing and seem to be out of harmony with the rest of nature. To one who for the first time travels in the desert, the attention which Indians and Mexicans pay to tracks, whether of human beings, horses, or of other domestic animals, is not understood, while those of wild animals seem more to the point. All tracks are to them as newspapers to us, and after having been for some time in the desert, one becomes equally interested in the stories they tell.

What was this man with the nailed boots doing here? Did he belong to the party of suspicious looking Mexicans whom the American prospectors from Tucson presented with provisions in Tinajas Altas? Or was he one of those whom the imagination of my impulsive Mexican credited with the murder of an American found dead on the playa? The hobnails did not seem to favor either theory. In this part of the continent only Americans use that kind of shoes; Mexicans prefer those of lighter weight. These must be American tracks and they must be those of a prospector, for they lead along the mountain sides and the prospector likes to see the formation of the rocks near by. The tracks did not point to some runaway, because they appeared in different parts, as if the man had been on leisurely business. I felt reassured as to the "vileness of man," though surely the "prospect pleased" in spite of the absence of water; the traveller is, in fact, apt to forget that this is a waterless region.

Along the banks of the arroyo where I had my siesta an exuberant growth of flowers was conspicuous for hundreds of yards. There were only two kinds, and they were both common bushes in this region, but, still beautiful in their best spring attire and of an unusual development, they presented a garden-like appearance. Here chuparosas grew as high as a man and twice that in diameter, each with thousands of labiate flowers, Venetian red in color. Interspersed with them was the white brittle bush bearing a dense mass of bright yellow flowers which resembled marguerites. There was no dust in the walks of this garden of nature, but only the cleanest, sandy gravel. Spring was in the air and I had seen the greasewoods that day covered with their lustrous flowers. In trying to photograph the quail I had been compelled to make my way through a luxuriant growth of the thorny quáviri bush now in leaf and with blue flowers, and the palo verde, from which my quail sent forth its defiant and melancholy cry, had already half developed blossoms which a little later would appear in extraordinary abundance.

The landscape gave an impression of moist subtropics and not of a country on the greater part of which no rain had fallen for nearly half a year. Probably a scanty flow of water had run in the arroyo for the last time on January 1, when it rained at Yuma, but, rain or no rain, spring in ~~that country~~ comes as usual, and there was no indication of the lack of water. To be sure, little animal life was seen that day beyond the quail and two small birds which told me that water could not be so very many miles away, but there was nothing to depress one in the peaceful landscape, over which the sun sent its wealth of light. To me the desert is radiant with good cheer; superb air there certainly is, and generous sunshine, and the hardy, healthy looking plants and trees with their abundant flowers inspire courage. One feels in communion with nature and the great silence is beneficial. Could I select the place where I should like best to die, my choice would be one such as this. I hope at least it may not fall to my lot to pass away in New York, where I might be embalmed before I was dead and where it costs so much to die that I might not leave enough wherewithal to defray the expenses of a funeral.

CHAPTER XIX

I OVERTAKE MY MEN—AGAIN AT TINAJAS ALTAS—PROGRESS UNDER DIFFICULTIES—EXPLORING IN *LOS MÉDANOS*—ASTONISHING DISPLAY OF FLOWERS—PICTURESQUE CAMP ON THE DUNES—I LOSE MY RIDING MULE—SIERRA DEL ROSARIO—TRAVEL AT NIGHT—THE WONDERFUL "ROOT OF THE SANDS"

My mule and I felt better for the little rest and with fresh gathered strength we continued our tracking and arrived in good time at Tinajas Altas, where I was delighted to find my two Indians. Since I had been at this place last some bushes had been burned in the arroyo, and there had also been dug two long, deep holes in the ground which served immediately to solve the mystery surrounding those Mexicans we had heard of, who were so strangely behaving and so well armed. They had been engaged in an occupation dearly loved by many of their countrymen—that of digging for hidden treasures. To bury money was the usual method of guarding it during the period of unsettled conditions in Mexico, and rumor has it that a great deal of *plata* (silver) was once deposited in this place for safe-keeping. People who returned from California in the fifties, or people who robbed those who did not return, have also been credited with the burying of treasures here.

At six o'clock, after a fresh gale from the south, there was a slight attempt at rain, which was repeated at nine o'clock when the wind ceased and the moon broke through the clouds. A few birds were singing at daybreak and there were numbers of bees and also bumblebees on the blossoms of the greasewoods. In a palo fierro that spread its branches over our "kitchen" I discovered the nest of a characteristic desert bird, the gnatcatcher (*polioptila*). Curious that this little bird could find its way to these lonely, hidden pools, fifty miles from the nearest watercourse, I climbed up to take a close look at it. Though the bird on the nest seemed restless, continually moving her black head to either side, she still remained sitting, and only repeated warnings of the male, which darted anxiously down toward her, finally caused her to fly away. The nest was cup-shaped and beautifully made of steel gray fibre taken from the seed pods of a certain vine, *philibertea linearis*, of which the Papagoes eat the pods either raw or boiled. Pedro, upon seeing my interest in the nest, expressed concern lest I should molest it, which was rather surprising, as he did not seem to harbor any other humane feelings with regard to animals either in his hunting expeditions or in the treatment of his own burro.

The sooner we undertook the proposed expedition to the unexplored sierra the better, while our animals were still in good condition, and one day's rest was all that could be allowed. My mule had drained the last water in the lower tank, so the Indians with a bucket scooped down some eighty gallons from the one next above. On the morning of our start *el doctor* did not succeed in collecting the burros until after nine o'clock. Further time was consumed in driving them up to the tank to drink, and after their loads were put on they seemed to take unkindly to the road and hid themselves among the greasewood bushes, giving my men no end of trouble, so it was nearly eleven o'clock when we finally got under way.

In order to allow my mule, which was very tired besides having a swollen back, to recuperate, I rode a burro, the first experience of this kind in my life. It was not exactly pleasant, for the tiny though strong animal had evidently never carried a rider on its back before, as she had been only used for carrying wood. She had absolutely no "mouth" and only *á garrotes* was it possible to make her move, and even that way sometimes failed. However, she could be made to go as long as she saw the other burros ahead, and by great and continued use of brute force I managed to keep along with the rest of the party up to the southernmost point of the range. Here I had to stop a few minutes to take an observation for my map, a sufficient time to allow the pack train to be lost from sight among the trees and bushes, and therefore, when I again mounted my diminutive ass, she absolutely refused to move in any direction. I had to dismount and try to drive her ahead of me, holding her by the rope, but only by running three times as much as she did, in order to prevent her from taking the wrong direction, and continually beating her, could I manage to make any progress. We ran into choyas, the spines of which fastened themselves into her face and onto me, and there was nothing else to do but to get rid of them, as they are troublesome and painful beyond description; then she would run in under the strong thorny branches of the palo fierro, from where she could be extricated only with the most energetic use of *force majeure*. After having advanced in this way two miles in a blazing sun, I found Pedro waiting for me farther down the arroyo, not wishing to leave me behind again. It was two o'clock and we were both hungry, but "*Aquel se fué*"—"he [Pancho] had gone on" —and we decided not to lose time by eating lunch, for I wanted to get as near the mountains as possible before night.

We passed the mountain that I call Cerro Pinto, to the south of the sierra, which is of a different, very dark color, and came out on the llanos south-west of it. The mountain range, which was our goal, here presented itself in full view. It runs in the usual direction and consists of several parts, some of them single mountains, stretched out for about fourteen miles. There are two main bodies of the sierra, each little range being perhaps four miles long; then follow mountains at both ends, more or less connected, some of them, especially those toward the north-west, being half submerged in huge sand dunes. The shape of the mountains is the usual one, the crests resembling the teeth of a saw. This succession of hill-tops is conspicuous even at a great distance; hence the name of *rosario* (rosary), which has been proposed, is appropriate and it should be called Sierra del Rosario.

The soil was harder than expected, and travel, accordingly, was quite easy. A wagon track, which was no doubt that of a prospector, led out in the same direction, but after a mile or two the wagon seemed to have turned back. A belt of large, bare dunes stretched in front of us, flanking the sierra toward the north. We steered toward the central part where the dunes are somewhat lower.

After six miles' travel from Cerro Pinto, we struck again the arroyo which we had left there. Its course, which lay perhaps only a mile and a half from our route, was easily distinguished by the growth of palo fierro on its banks, and farther down low sand dunes appeared on both sides of it.

On reaching the arroyo I was agreeably surprised by a magnificent display of flowers. It was again the *œnothera trichocalyx* that appeared, but on a much vaster scale than anything so far seen. Innumerable plants separated from each other by wide spaces seemed like old friends to me, as the large, pure white flowers nodded in the mild, south-western breeze of a late afternoon. The verdure of the plants was intense and they looked as fresh as if they were growing on the highlands of Norway. Some of the bunches were over five feet in diameter and had more than a hundred flowers. It may be that the famous rain of January the 1st of an otherwise rainless winter had reached here. What the vast stretches of low sand dunes in that western region are like, after the ordinary winter showers, may be easily imagined, and a long journey to see them would be worth the while of a lover of nature. Although the

ŒNOTHERA TRICHOCALYX, NEAR SIERRA DEL ROSARIO

ŒNOTHERA TRICHOCALYX, NEAR SIERRA DEL ROSARIO. A FINE GROWTH

ŒNOTHERA TRICHOCALYX, SOUTH OF SIERRA BLANCA

UofM

white flowers were the most conspicuous, three more species were growing here. There would be places where only yellow flowers grew, the smaller species (*baileya multiradiata*) reminding one of certain marguerites; the larger species was an *encelia*. Then again, and this was perhaps more frequent, some flowers which resembled verbena, of a deep rose purple (*abronia umbellata*) would appear exclusively; they grew in beds, close to the surface, and made a most charming picture. These had a strong perfume such as that of night violets, while the white ones had only a slight scent, like that of water-lilies.

It was half an hour before sunset when we entered this field of beauty, the men wading knee-deep among the flowers and paying no more attention to them than if they were air, while the burros ate them as they passed along. The air was filled with perfume during the three miles we travelled through this most attractive nursery of mother nature. We then climbed up on the great sand dunes and, as darkness set in, made camp there, a fine view of the sierra, still more than three miles distant, before us.

I warned Pedro to hobble all the animals especially well. There was no other danger than that of losing some animal in the night through carelessness in tying the rope which binds their forelegs together. He assured me that it had been done carefully, but he was in a bad humor and said there was no wood, so he was not going to prepare any food. It was late and he was hungry and had much to do, as the "doctor" was not able to be of much assistance in "kitchen" work, so I excused his mode of expressing himself. I went out myself to gather canutillo and dry branches from some solitary greasewood bushes nearby and the "doctor" also brought a load of canutillo. I told Pedro there was no necessity for making tortillas that night, that we would open two cans of corned beef and one of tomatoes. He made coffee and we had a good supper. It was Pedro's habit to get angry and say harsh things without warning, but his wrath passed very quickly. It seemed nice to be among the médanos again; the day had been very fatiguing and it was pleasant to stretch oneself out on a soft bed of clean sand, while viewing by moonlight the sierra we were to visit the next day.

In the morning Doctor Pancho brought the bad news that my riding mule had broken its hobble and gone. He showed the piece of strong horse-hair rope which in Mexican fashion had served as a hobble. I had my suspicions that it was a matter of carelessness on the part of Pedro who was as stubborn and know-it-all as the burro he rode, intelligent and efficient as he otherwise was. The mule probably had started back to our camp at Los Papagos and, though the "doctor" offered to go out again and look for it, small hope could be attached to the success of his efforts. It was an unpleasant prospect, having to exchange my spirited young animal with an excellent gait for a burro, but the sooner I reconciled myself to its loss, there being slight chance of its recovery, the better for me. After I had taken some photographs, changed films in my kodaks, and made additions to my map, we put the baggage together and covered it with my tent fly, the two barrels of water, the most important part of our outfit, being in that way safe from attack from the burros; the latter have a peculiar way of removing the two wooden stoppers from the barrel with their teeth and then overturning it to get at the water. They are also mischievous in other ways and will chew up papers, but there was nobody else to guard against, and this is one advantage at least that one has in the desert.

Doctor Pancho had already departed on his rather hopeless quest, when Pedro and I, each mounted on a burro, started for our unknown land. The sand dunes lasted for three miles more, up to a distance of a mile or so from the mountain range. We were still surrounded by flowers in all the little valleys of the sand dunes, and as the latter diminished in height the number of flowers increased until at last in the low outskirts we met with an unusual wealth of the purple kind, forming a carpet for the greasewoods and even growing on the somewhat harder soil next to the sand.

These hitherto unvisited mountains showed the usual formation of light gray granite with streaks of reddish color. Seen at close range, the sierras of the desert region, weather-worn and washed away, cannot be pronounced attractive looking, but such is certainly not the case with the vegetation, which they are instrumental in bringing forth in that arid region. For the very soil of its growth once formed part of these mountains and may be called their detritus. We ascended a pass in a spur of the mountains toward the north and east and returned by another, some two hundred and fifty feet above the base. There was a nice view from there, north-west over the little valley or inlet, sand dunes like huge snow fans breaking in over the mountains toward the north and threatening to cover them up. The dry arroyo of the inlet was surprisingly wide in its short whirling course, which is edged by numerous palo fierro trees, indicating that the mountain sides are capable of gathering much water at times. Old trails were passed, and broken pottery and a pounding-hole, in which the Indians had crushed mezquite beans, were evidences of the presence formerly of Papago Indians, who camped here at times, carrying water with them, doubtless in gourds.

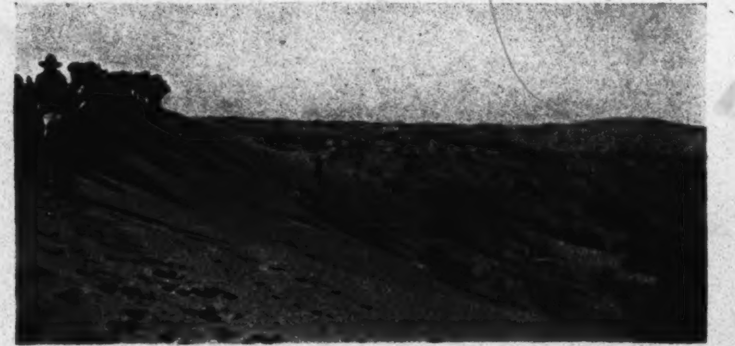
The odor of the stunted torote tree and other resinous plants was agreeable. Along the base of the mountains the flowers of the palo fierro attracted many *hymenoptera.* I noticed a small gray bird, perhaps a thrasher, running among the stones on the mountain side near the base; an unmistakable thrasher of a larger size was also seen. Retracing our steps around the southern part of the middle mountain, we reached through an easy pass the west side of the sierra. Contrary to our expectations, a small llano was found here, covered with greasewood growth and skirted by sand dunes at four or five miles' distance toward the south. Fresh tracks of mountain-sheep were seen. The shrill notes of hawks startled the silence as usual and toward sunset I could distinguish the singing of three different birds. The water in Tinajas Altas, from twenty to twenty-five miles away, is the nearest.

It grew dark before we were able to begin our return to camp. Approaching the place where we had seen such a quantity of the purple flowers, their delicious perfume, which is strongest at night, was felt long before we could see them. The first thing to do was to strike our own tracks of the morning, else it would be decidedly difficult to find the camp as the dunes looked very much alike. When we had once struck them we could safely leave the rest to our riding animals, for the burros with remarkable ease are able to follow tracks even in a pitch-dark night. Pedro, who weighed 215 pounds, dismounted from his steed and put it ahead of the procession, which it eagerly led home. I had begun to be reconciled to my small but powerful mount; it seemed all muscle and hard as a rock, as it safely and surely made for camp, working knee-deep in the soft sand.

The great waves of dunes extended in almost the same direction that we travelled, namely, toward north north-east. The moon cast its pale light over the peculiar landscape and made it look like winter. Travel at night always seems to take a long time, and we thought so, especially as the dunes grew higher. The fantastic, nonchalant canutillo, a greasewood bush half buried in the sand, and a tuft of grass here and there, were the only vegetation apparent. Finally a small but friendly and very welcome light appeared from our camp in a declivity between two waves of dunes; a few minutes more and our busy day was over.

Doctor Pancho, in our absence, had made himself useful by gathering a lot of fuel, such as it was, and he had cooked bones of mountain-sheep with tépari beans for us. He had not been able to overtake the mule, but he had prepared a very pleasant surprise for me in the shape of four specimens of the "root of the sands," the Indian name for a much coveted dish. They lay in a row on the sand and looked very interesting. I had heard much of this plant, for even the Mexicans relish the camote of the médanos, as they call it, but the past rainless winter had held out little hope that my desire to see it would be realized. This peculiar plant, which is about three feet long, has no leaves and looks like a root covered with scales which grow thicker toward the top. It protrudes slightly above the sand, ending in a button-like excrescence on the upper surface of which there is observable more than a dozen tiny light blue bells. It is only found in the large barren sand-hills in the months of March and April, and during this time the Papagoes in former days used to gather at such localities, living almost exclusively on the plant. In May and June the part of the plant which grows above the surface withers and disappears.

Selecting the three best ones as specimens to be taken along, I sampled one of them and found it to be a succulent and excellent food. It is more tender than a radish, as well as much more juicy, and the whole root can be eaten. It has a sweetish and agreeable flavor all its own. The Indians usually toast these plants on the coals, when they resemble sweet potatoes in taste,



Clodomiro digging for "roots of the sands" (*Camotes*)

The "roots of the sands" (*Ammobroma sonoræ*)

My companions, "Doctor" Pancho (to the left) and Pedro

but I prefer to eat them raw. They are an especially delicious relish to a thirsty man, and they also quickly appease his hunger; in fact, of all the many kinds of edible roots that I have tried in their uncooked state, used among natives in different parts of the earth, I know of none which can compare with this one in refreshing and palatable qualities. We came across some more of them later in the dunes south of Pinacate, which were a smaller form. They practically furnish both food and drink and, after an ordinary winter season of light showers, are found in great numbers among the largest sand dunes along the upper coast of the Gulf of California. They have also been found in other parts of Sonora as, for instance, at Lerdo.

This extraordinary creation of the desert has the well-sounding as well as appropriate name *ammobroma sonoræ* (sand food). Its native name is *bíatatk* (*bía*, sand, sand-dunes; *tatk*, root). It was first mentioned by Dr. Asa Gray in 1854 as a "large and fleshy root-parasite growing in the naked sands of the desert at the head of the Gulf of California." It had been discovered in the same year by Col. Andrew B. Gray, during his "survey and explorations for ascertaining the practicability of constructing a southern railway to the Pacific." Apparently this highly useful plant might be transplanted to advantage to other desert regions of the earth.

CHAPTER XX

RETURN TO TINAJAS ALTAS—EVASIVE TRAVELLERS—AN "OLD-TIMER"—THE CABEZA PRIETA MOUNTAINS—VAGUE NOTIONS OF PROPERTY—THE POOLS OF CABEZA PRIETA—A RAINY DAY—I REACH MY MAIN CAMP—THE ADVANTAGE OF TRAVEL WITH DONKEYS—MY INDIAN COMPANIONS—THE SAND PEOPLE

WHILE it was still dark the next morning, we were again in activity by the light of our guiding morning star—to rise at dawn would have been a very late hour for us. To the annoyance of Pedro, who always wanted to hurry, an hour was spent on the road photographing the flowers. It was night when we arrived at Tinajas Altas, a moderate gale from the south-east blowing, and we all felt tired. Four unwelcome strangers made their appearance, driving up their wagon outside of the little valley. They were evidently American citizens from somewhere on the Gila River, most of them Mexicans, and the owner of the wagon and the fat horses was an unpleasant old Italian. They were not prospectors, and they were a queer lot—very different from the ordinary Mexicans—and they gave me an uneasy feeling because of their underhanded and evasive ways. Probably they were nothing worse than treasure hunters, but it was a relief to have them continue their journey next morning, while we recuperated here another day.

Pedro found that my lost mule had watered at the tinaja, and after following its tracks for many miles he concluded that it had continued on its way back; a few weeks later the Indians brought it to me in Sonoita. In the afternoon, toward sunset, a small man on horseback turned up. He was old and his face was almost hidden under an immense straw hat. His horse was dragging along a log of mezquite, for firewood is rare at Tinajas Altas. He bowed his head to me in a genial way and I saw at a glance that I had an "old-timer" before me. He was a prospector and his companion would soon follow him in a wagon. The new-comer was such a contrast to the evasive men of the morning that his appearance gave me genuine delight. He said they were from Mohawk on a prospecting tour to Pinacate. I suggested that lava fields generally were not good places to find gold, although I had heard that samples of gold-bearing malpais (lava) have been picked up in the region north of Pinacate. It was just there that he was going, and from a pouch tied to a string around his neck he brought forth for my admiring eyes a most unusual sample of free gold that literally studded a dark brown piece of rock which, in fact, seemed to be old lava.

In the evening I spent a pleasant hour in the cheerful camp of the two American Mexicans. The old prospector was an entertaining man, quite at home in the desert, where he had made many a journey in vain pursuit of the elusive metal. He had prospected in Sierra del Viejo where Cipriano Ortega once worked a silver mine which was lost later and could never be found again. He had also been looking for the lost mission and showed where some years ago my friend, Prof. W.

J. McGee, "walking barefoot," he said, for the sake of his health, had camped in a hut made among the rocks near the lower tank. Their outfit was not substantial; in a light wagon they carried their provisions, and their water supply was kept in cast-off Standard Oil cans. I told them that it would be difficult, and perhaps impossible, to find any water at the Tule well, but their enthusiasm and determination recognized no obstacles.

As we were about to go our separate ways the next morning, the old prospector brought four eggs which he wanted to present to me. He urged me to accept them, as they had a dozen more for themselves. This would be a trivial matter in the ordinary routine of life, but was touching under circumstances like these. I promised in return to present him with mountain-sheep meat when he arrived at Los Papagos, where he was going to establish his camp and where I hoped to see him again later. He and his companion never turned up, however, and I sincerely hope that nothing untoward happened to them to which his thirty years' experience in the desert was inadequate.

The weather was much cooler than I expected on this trip, a nice breeze of moderate strength blowing every day, and the nights were almost too cool. Even in April it is still possible to travel in that region without much discomfort. At the Cabeza Prieta range we made camp in a pass near some large red trachyte boulders. The reddish looking mountains seemed to be even more than usually narrow-crested and steep. We made a tour through the central part and came to an interesting short, box-like cañon surrounded by mountains that seemed higher and more difficult to ascend than they were in reality. While we were considering as to which way we had better proceed, two female mountain-sheep appeared frequently on a ridge against the sky, watching us for many minutes and then disappearing and returning again. As we needed provisions, the two Indians went after them, while I took a circuitous route for camp. The flock consisted of seven, which I observed moving about the top of a ridge in leisurely fashion for some time; they were all females and three of them very young.

On my return to camp at dusk, my Indians had not yet arrived. At eight o'clock they slowly approached the fire carrying all the meat of two sheep. They had mistaken the road, and had come across an American *campo* (tent) where they had discovered a sack half-full of onions and another with potatoes. Pedro told me that the doctor had helped himself from each sack and asked me whether I would eat them. As I answered him with a decided negative, he said they would eat them.

It was not edifying to see my men consume the stolen goods, but as the heavy burden of meat they carried had made it impossible for them to take away with them any great quantity, I told them that Americans were *buenos* (generous) and probably would not mind. But I was very much put out when the next day, as we were filling our barrels at the tinajas of the Cabeza Prieta, I made the disagreeable discovery that we had two buckets instead of one. "*Aquel* [the doctor] took it from the Americans," Pedro said. When I remarked reproachfully that this was not right and asked him with what the Americans on their return would fill their barrels, he answered: "The doctor said there were six or seven and, as the Americans did not need them all, he carried off one." What can one do under such circumstances to satisfy the requirements of ethics? Travelling alone in the wilderness with two Indians, I was to a certain extent in their power, and was forced to act diplomatically; we were too far away to return the bucket, for our supply of flour would soon be exhausted and our animals had to be considered.

There are said to be as many as eight pools at Cabeza Prieta, each higher than the other. The four lower ones were empty, and the water had to be scooped down from above from one to the other, so that we could fill our barrels and that our animals might drink. It is tedious and rather primitive to have to depend on tinajas for one's existence, and these were even less accessible than usual, the entrance being through a narrow cañon. On entering this I had noticed six heaps of stones placed in a row as if to show the way to the water and had been made by the Indians long ago. Later on, at the pass near Tinaja del Tule, I saw six much smaller stone heaps, five of them forming a circle ten feet in diameter. The sixth pile was outside of the ring toward the west, separated from the rest by the same distance as that between each of the others.

The day surprised us by being actually rainy, foggy, and chilly, and the mountain tops were hidden in mist. The showers came usually from the south-east and would

SIERRA DEL ROSARIO, NORTHERN PART

CABEZA PRIETA RANGE. AN INTERIOR, LOOKING WESTWARD. A DRY ARROYO AT THE BOTTOM

last only a few minutes, occurring intermittently, but toward six o'clock we had some heavier rain, and when we camped we were wet as well as our baggage. Three days later, on Sunday, March 27, we arrived again at Tinaja de los Papagos. The aspect of the landscape around the arroyo in which our camp was placed had changed much during our absence; it was like summer now, the mezquites were in their beautiful foliage and blossom, and the light-yellow flowers—yellower than lemon—of the palo verde were very conspicuous, making the arroyo yellow and green. The camp gave me quite a feeling of home. My tent looked agreeably white, clean, and comfortable among the trees, and the members of the expedition who had remained behind received us warmly. Guadalupe made tortillas and we were treated to a famous stew of mountain-sheep that tasted good though it was cooked in only half an hour, the last onion having been reserved for the occasion.

It had been a very hazy day; distant mountains stood enveloped in a thin mist and sand was raised on the llanos by an increasingly strong southern gale which sprang up during the afternoon. At sunset it abated in force and turned south-easterly. Though the air felt damp, the moon shone brightly when I retired for the night; ten minutes later, at nine o'clock, I was surprised by the falling of a few drops of rain on my tent. The sky was now overcast and threatening, so we had to prepare for a rainy night. Hardly had we covered up the baggage, a matter of five minutes, when a light breeze from the north cleared the sky and it was calm again. Thus ended the little shower of the desert which had been born from the atmospheric disturbances of a whole day.

I had been away with the two Indians for thirteen days, our burros travelling nearly one hundred and fifty miles, and during that time we had called for water only at two places, Tinajas Altas and Tinajas de la Cabeza Prieta, but our animals returned in good condition. I had learned at least one thing on this short expedition, and that is that donkeys are without comparison the best animals for exploration of the American desert. Remarkably strong and very hardy for their size, they are contented with humble fare, making themselves at home in any camp the traveller may choose in that arid region. Their first move is to caress each other's necks, while the horses stand about sulky and discontented; next they find some bushes or leaves of trees or odd-looking plants to eat, and in the winter three days without water does not trouble them. They know how to take care of themselves and, having once been shown a waterhole, they do not have to be led to it again, but go thither at their pleasure; horses usually have to be driven to the hole again and again. Donkeys do not stray much and in the morning the traveller will nearly always find them all together ready to continue the journey. The more a burro is loaded, the faster it walks, in order to reach camp so much the sooner. The burro is not as rough to ride as one would expect; a few have a gait as pleasant as that of a good mule, but it must be confessed that there are drawbacks to its use under the saddle. It is slower than a horse or a mule and, although far more intelligent than either, it is stubborn and difficult to move when one is anxious to reach a certain point, to take a quick photograph, etc. If riding alone, it is next to impossible to have one's burro stop more than for a few seconds, as its sole aim is to be close to its mates. In order to take down notes one either has to dismount or stop the pack train. This drawback could be remedied by having a man following on another burro. And if the traveller knows how to accommodate himself to various conditions, he will find this animal invaluable for certain kinds of exploration.

My two Indians, though not altogether pleasant companions, had served me as well as could be expected. As a packer and manager of our outfit Pedro had done good work, even measured by a white man's standard. He was a fair cook, though too stubborn and set in his ways to accept any advice. He was able to repair anything well that might get out of order on such a trip, and he did all his work with incredible quickness. He had taught himself to cut hair and exercised his dexterity on my head to my entire satisfaction. Being furthermore a good tracker and an excellent shot, he would make an admirable servant on any expedition but for his bad temper; he was inclined unexpectedly to say disagreeable things, but, if he were met by a decided countenance, would in a few minutes be pleasant in manners and in speech. It was impossible to get any ethnological information from him, owing to his great disinclination to discuss Indians and their affairs. He was taciturn, and what he had to say he uttered in a very low voice. Not much escaped his watchful eyes, however, and his physiognomy betrayed brutality and cruelty, though he was not without tender feelings, as evidenced when he did not want to cut down a palo fierro in which he discovered a little bird had its nest. His courage was undisputed, and if he liked a white man he would in case of danger stand by him to his last breath.

Doctor Pancho, the medicine-man, had rather an engaging, humorous face. He was always ready to serve and he, too, was quick in his actions. He had an energetic disposition and did good service in finding wood quickly, grinding coffee, boiling meat, cleaning pigeons, and such work. He was even-tempered, and only once, when I, after having lost my note-book, had to ask him some questions over again in regard to local names, did he rise up in dignified wrath, saying with much feeling that he had given me this in four books, and if I wanted to hear it again I would have to ask somebody else. But, taking it all in all, he was willing to give information, and, what was more, gave it correctly, which was much to be thankful for. There was a certain slyness about him, and the Indians were afraid of him as a sorcerer. His mind was always on the alert for something that might prove useful to him. He used to pick up discarded papers and put them away for safe-keeping. He was not very good in following tracks, but knew how to trap wild animals, and the rapid and dexterous manner in which he prepared them for eating reminded me of the ways of the Australian savages. His ideas about property were not highly developed and, though he was a man of a much nicer disposition than Pedro, in an emergency I think I should rather trust myself to the brutal sagacity of the latter.

Judging from these two and from a third one, Agustin, that I knew, the sand people were not a pleasant lot to deal with. They were rapacious and probably merciless to strangers, whether Indians or Mexicans. Agustin was a distant, disagreeable kind of a man, whose confidence it would take years to win. According to Mexican accounts, the areneños formerly made the roads dangerous to pass, and nobody could follow them into the sand dunes to their principal retreat at Pinacate.

These Papagoes were called Híatit Óotam, "sand people." According to my companion, the medicine-man Pancho, who spent his early life in the dunes, they were not many in number and used to travel all together. He asserted that a peculiar disease accompanied by the vomiting of "yellow and green and then blood" killed most of those natives, and thought that it was brought from Yuma. The course of the disease took from four to ten days. It probably is the same affliction that is mentioned on the Papago calendar stick (page 74) as having occurred in 1851. The remaining four families decided to retire to other parts and for the last forty or fifty years the sand dune country has been uninhabited. These natives probably never exceeded in number one hundred and fifty all told, and their head-quarters were at *Hótunikat* (sunset), south of Pinacate. The great annual feast, now given at Quitovac, was removed from the Pinacate region before my informant's time—thus at least over seventy years ago—because the old men who had charge of the ceremonial objects of the feast had died, and it was decided that the latter should be taken care of at Quitovac.

These sand people were intelligent, healthy, and able-bodied, and managed to make a good living in an absolute desert. Their existence depended upon the knowledge of the few places in the mountain ranges, not even one in each range, where rain fills the tinajas, as well as of the few places along the coast where water can be found by digging for it. Once where to look for water is known, the difficulties in making a living out there are not so great as one would expect. In hot weather they followed jack-rabbits in the loose sand until the latter were exhausted, and caught muskrats by burning the accumulations of cactus spines with which those animals keep enemies away from their burrows. They also killed mountain-sheep, which were not a difficult quarry, with their bows and arrows, especially in the large craters, and they were even able to approach mule-deer and antelope near enough to kill them by the same weapon. Lizards were eaten. At certain seasons they went to the coast for the fishing, catching as many fish as they wished.

A single agricultural site may be attributed to the sand people, called Súvuk, south-east of Tinajas de Emilia, in Pinacate. Maize, squashes, and beans were planted here by means of a stick, on a very small scale, but the majority of these people had no agriculture whatever. They found good edible plant food in the dunes, especially *ammobroma sonoræ*, the wonderful camotes which the Indians knew how to gather all the year round, though after May that part of the plant which is above ground withers away. They had their season of chia and used to come as far as Quitovaquita and Santo Domingo to gather mezquite beans (called by the Mexicans *pechita*) and eat sahuaro and pitahaya. Near all the tinajas are seen round holes from six to ten inches deep, made into the solid rock, in which these Indians pounded mezquite beans. Their pestles are frequently found. The beans of the palo fierro were toasted, ground, and consumed as pinole. After the scanty winter rains the juicy plant of the sand dunes, *œnothera trichocalyx*, was boiled and eaten.

The clothing of these people was made from the skin of mule-deer, antelope, or mountain-sheep. The hair was first removed with a bone taken from the lower foreleg of the animal, and the skin was smeared with the brains. The root of the torote tree, crushed and left in water, furnished necessary material for the tanning process. The man wore shirt and breech cloth, the woman a short skirt. They killed sea lions on the rocks by hitting them on the nose, and from their skins sandals and straps were cut. From the badger's hair they were able to plait ribbons for the hair and make twine to be used for the breech cloth. Women wore sandals, but no hair ribbons. The skirt was kept up by strings of buckskin.

The burden basket was not used, but they made carrying nets as well as pottery, material for which is abundant on the coast. Baskets were manufactured from torote, willow, and bulrushes. In order to make bows, these Indians travelled as far as the Colorado River to get willow as material. Arrows were made from the arrow-bush. Arrow-points of hard stone have occasionally been found in that country, but never stone axes.

They had foot-races and also practised the game of throwing with the end of a thin pole two short pieces of wood which are linked together. (Page 89.) In the winter time they lived at a higher elevation in the mountains where they erected grass huts. Once a year a journey was made to Yuma to barter with the Indians there, and maize, tépari beans, and squashes were exchanged for baskets and sea-shells. Remnants of these people are living at Quitovaquita and the Growler Well, both places in Arizona. A few families are said to live near the railway station, Adonde, near Wellton, on the Southern Pacific line.

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CHAPTER XXI

AN INDIAN HERMIT—ABORIGINAL COOKING—AGAIN IN SONOITA —ANCIENT VILLAGE SITES AROUND THE ALTAR RIVER—A REMEDY FOR SNAKE BITES—I ARRIVE AT AJO, ARIZONA—GILA BEND RESERVATION—AN ANCIENT FORTRESS—THE MARICOPA INDIANS—THE WAYS OF CIVILIZATION—THE PIMA INDIANS—CASA GRANDE—ITS BUILDERS—RETURN TO CIVILIZATION

As we started back for Sonoita, Caravajales, the Indian hermit of Los Papagos, joined us. He owns a burro and a horse and plants a little maize, besides raising a few squashes and watermelons. He catches fish on the coast also, but camotes, the "roots of the sands," form his principal means of subsistence. In fact he lives almost entirely on these camotes, and is able to find them out of season. He often goes without food for days, which does not trouble him, as he is the proud possessor of a canteen and in his travels is never without water. He confided his secrets and domestic troubles to Guadalupe, who told me about them. When his wife left him a few years before, he decided to go back again to live in the médanos where he was born. Once a year he visits Sonoita to see relatives and to get drunk. There is no harm in the elderly man, but neither is he sympathetic. He is thin, rather bald, and almost completely deaf, but seems to be healthy. Recently he had been in Quitovaquita for two days and had remained without eating during that time; then he had ridden to get the camotes for three days more without food.

On the slopes of the lava plateau north of Pinacate there was a notable increase in the number of the white choyas (*opuntia fulgida*), which looked at their best among scattered greasewoods and other bushes. Often at a distance I mistook them for the white or gray shirts of my men. At least six times I noticed branches of greasewood cut off and lying on the ground. This was, according to Pancho, the medicine-man, the work of jack-rabbits, which eat both branches and leaves. The Indians in the evening cooked one of these animals in hot ashes covered with earth, on top of which a fire was made. The "doctor" prepared it for cooking by breaking its legs with a stick (a matter of a few seconds) and then singeing the hair of the whole body over the fire. He had first cut off the ears, for they are considered a great delicacy, and put them aside to be eaten by him later. The meat of the jack-rabbit is much coveted by the Papagos, who often run these animals down on horseback. Parties are sometimes gotten up for this kind of hunting.

On reaching Sonoita nearly all the members of the expedition were allowed to depart, each taking home a sack of dried mountain-sheep meat, and I began to make various excursions in the neighborhood, once going as far as Altar. While driving, one of our pair of mules actually stepped across a fine large rattlesnake. I expected to see it strike, for there was no time to stop as the reptile was entwined between the mule's feet, but for a wonder, they did not touch it and the snake made its escape calmly without even the usual rattling.

I visited several ancient village sites in the Altar River valley. One, at the ranch of Llano Blanco, on the bank of the Magdalena River, just before its junction with the Altar River, was a mile long and a quarter of a mile broad. Thousands of pieces of hard stones, chipped away in the making of weapons or implements, were lying on the ground, and for six miles from there on until the Ventana ranch is reached, numbers of potsherds were seen, which may also be observed for a greater distance up the river. Numerous well-made stone objects have been found here as well as at Pitiquito, farther down the Altar River. Small stone images have been encountered in this valley; one, about four and a half inches high, made of a chocolate-brown stone much like jade in texture, was picked up by a vaquero on the ground near Pitiquito. Large bracelets of shell have been found here, and also some peculiar antiquities consisting of stone bars or ceremonial wands, most of them cylindrical in shape and pointed at the ends, which I discovered in houses of the Mexicans as far west as the ranch Chireones, fifteen miles from Altar.

In the District of Altar I heard very favorable reports of a remedy for bites of snakes and scorpions. The secret was conveyed to me for the benefit of the world at large, and my informant had learned it thirty years before from an Indian. The remedy consists of the excrements of a leaf-eating ant (*pogonomyrmex barbatus*), common in those parts and called *mochomo*, and a plant called *golon-*

drina. There are two kinds of golondrina, and it is the small one (*amphorbia polycarpa*) from the low mountains that is used, and not the one that grows two or three feet high in the cultivated fields. The two ingredients should be crushed, alcohol added, and the thick mixture applied to the wound and held there by a bandage. The pain should subside at once with this treatment. The addition of leaves of the red-flowering oleander (in Spanish called *laurel*) is said to be an improvement. But the mochomo by itself is maintained to be wonderfully effective. Perhaps the fact that the ants feed on the leaves of the greasewood, which are very antiseptic, may have something to do with the efficaciousness of the remedy. As my authority was an intelligent and judicious Mexican, an examination by a competent judge, especially of the mochomo, which is easily procured anywhere in that region, would seem to be warranted.

On my return to civilization from Sonoita, I crossed the boundary into Arizona, stopping first at Ajo, the name of an apparently great copper mine, on which work had been temporarily abandoned. Contrary to expectation, it is from the point of view of scenery a beautiful place, situated as it is among picturesque-looking hills. Even at a considerable distance, coming from the south, large streaks of green on some of the hill-tops due to the prevalence of copper are plainly visible. The weather was very warm for twelve days, and from the 24th of May till the 4th of June an average maximum temperature of nearly 106° F. was shown. The highest temperature was 117° F. on the 30th of May. When it attained this point the sensation was that of walking between great fires. However, the heat, being very dry, was quite bearable and the nights were pleasant.

At Gila Bend railroad station I camped in a Mexican corral, and found my camp agreeable on account of the abundance of clear and easily accessible water, which was all the more satisfying after my long absence from civilized comforts of any kind. I continued my journey to a small reservation for the Papago Indians north of there, camping at the well of the Pelon rancheria under the shade of a clump of large mezquites. From here I made a visit to an ancient village known under the name of "The Fortress" (*fortin* in Spanish). Crossing the wide river-bed of the Gila River, on the banks of which batamotes grew exuberantly, the village is found on top of a detached hill, which was admirably adapted for defence, being protected on the side easiest of access by a stone wall two hundred yards long, from six to eight feet high and from four to five feet wide, running east and west. The houses, like the wall, are made of stones well set without masonry. One of the largest houses measured sixteen by twenty feet, and the walls were three feet thick in all of them. A dozen dwellings were found outside of the wall, and nearly thirty were counted inside, standing in irregular groups. The Papagoes call the fortress *kokulisik* (*kôkuli*, corral).

The Gila Bend Reservation consists of three rancherias: Pelon, or "lower village"; Tesota, or "second village," and an "upper village," which has only a Papago name, Siilimök ("burnt saddle"). There are about three hundred souls in all of them. In the "upper village" I found most of the people away harvesting wheat for the Pimas, for these Papago Indians are not restricted to the reservation.

Arriving at the agricultural settlements on the Gila River, I felt as if I had come to another country. Miles of waving wheat and alfalfa fields and the smell of humid earth, all brought about by the magic of irrigation, were a delightful demonstration of the remarkable agricultural possibilities of certain portions of the great western desert.

The agency of the Maricopa Indians was next reached. It is in the western corner of the Gila River Reservation and presented an attractive appearance situated among cultivated fields in the height of mid-summer. These were not Indian fields, as one would expect, but belonged to white farmers who owned, I was told, four of the irrigating ditches, while the Indians had one. The land set apart for the latter is not good—only fair—but by heavy irrigation the Indians manage to make the alkaline soil serviceable.

A comfortable looking cottage with red tiled roof and a shady veranda on a spacious greensward indicated where the agent lived, while at some distance from the house I noticed a number of shelves on the wall under the porch, built one above the other, and, at a casual glance, there appeared to be photographs placed there for sale, but as I passed through the gate I discovered that these were rows of medicine bottles within a large open closet. A drug store in the land of sunshine and good cheer! The idea of disease seemed wholly anomalous in this dry air, bracing in spite of the noon-day heat. I knew, of course, that the Indians had acquired consumption since their contact with the whites, but I was puzzled to learn what other diseases this array of medicines was intended for. So I stepped up to a young, pleasant looking man, who was grooming his horses in a shed near by and who turned out to be the agent. "Are the Maricopa a healthy race?" I inquired. "No, I don't think so; there is much disease here." "So you need all that medicine which I see on the porch?" "Yes, indeed; there has been an epidemic of measles and we still have ten cases, though whooping cough is now the great trouble, for it often develops into bronchial pneumonia and kills many, and we have had to close the day school. There is always consumption here, and I often have to treat syphilitic ulcers," he added as he concluded the distressing list of the effects of the so-called civilization on the surviving three hundred members of a once healthy tribe.

The Pima Indians, for whose benefit the larger part of the Gila River Reservation was set aside, are not dying out, in spite of having suffered much from the whites, who have been known to divert the river water, the source of life to the Indians who live farther down its course. Their number is rather on the increase. According to information furnished me by the agent at Sacaton, there were living on the Gila River Reservation in June, 1909, 4,086 Pima, 203 Papago, and 337 Maricopa Indians. They are an industrious people and virile, though of a mild, even disposition. Since the first days of the coming of the whites, they were of assistance to them, showing as much kindness to the early explorers, pioneers, and gold seekers as the Apaches exhibited hostility. They used to raise cotton, which they still do to a small extent, and although they made blankets as late as forty years ago, spinning and weaving have been abandoned. Their basketry was noted for good workmanship, though it was inferior to that of the Apache, but since their contact with whites the art has much deteriorated. Small circular storehouses of twisted rolls of arrow-bush may be noticed outside some of the dwellings. Similar structures for the storage of mezquite beans may be seen on the roofs. At Gila Crossing a surprising number of old-fashioned round grass huts were observed.

There are several ancient ruins in or near the country occupied at the present day by the Pima, the most important of which is the noted Casa Grande which has often been described. The walls, from three and a half to four feet or more thick, are made of big blocks of earth or grout which when dried become as hard as stone. The rafters are of cedar and the rooms are symmetrical; three stories remain, but there were four originally. I viewed with much interest the work that lately had been done for the United States Government to redeem the original features of this place, thereby assisting any one at all concerned in the history of this continent to get a clear idea of the doings of the ancient people. Gratifying and necessary as is the preservation of what remained of the principal part of the ruins, it seems a pity that the shed erected for the purpose could not have been made large enough to permit a less obstructed view of the grand building. It should have been higher and wider. I suppose economic considerations may have had something to do with the arrangement that comes dangerously near preserving the ruin out of sight. At any rate, its imposing character is lost. Nevertheless, it is to be hoped that the ruins, now that they have been cleared of dĕbris and present a comprehensible example of ancient American architecture and life, will be made an objective point for visits of people interested in the early history of America. It is now possible to walk around in the well-preserved rooms where the Jesuit Father Kino said mass in 1694, the same year that the ruins were discovered. Visitors will, however, go further back and marvel at the skill of the ancient builders, although, if measured by modern standards, faults may be found in the construction. An exhibition of implements and weapons found during the clearing up of the dĕbris adds to the interest.

The stone implements unearthed here are of the same general character as the ancient ones which I collected in the present-day Papagueria. A large stone scraper and a double-edged axe appear identical with specimens which were secured by me farther south in Arizona, and which I do not believe were made by the ancestors of the present Pima and Papago Indians. It is noteworthy that wooden hoes were unearthed at Casa Grande which seem to be exactly the same kind as those until quite recently used by the Papago, of which I was able to collect several specimens in the Santa Rosa valley, south of Kohatk.

Their presence at Casa Grande does not in my opinion necessarily imply that the ancestors of the present occupants of that region had anything to do with the building of this noble structure. Granted that the methods of its makers were thoroughly aboriginal and even crude, it is a far step from the Pima and Papago dome-shaped grass huts, practical as they are in the desert, to the four story, thick-walled building in question. The decorative art of these two native peoples as compared, for instance, with that of the Pueblo Indians, is mediocre, and their handicraft in workmanship and finish does not even equal that of some of the western tribes who live under similar conditions. This certainly indicates a considerably lower state of culture than that suggested by the beautifully symmetrical, polished stone implements which have been found at Casa Grande and other ruins and ancient village sites of the region south of the Gila River, and farther south and east than the Altar River in Sonora. The lack of architectural skill evinced by the Pima and the Papago and their little developed æsthetic sense seem to me utterly at variance with the theory that the tribe or tribes in question built the Casa Grande. Its builders must be sought among their predecessors in the Papagueria.

The trip from the ruins to the Casa Grande railroad station was made leisurely and in a short time. Arriving there at sunset, I camped back of the houses among several small parties of teamsters, mainly Indians. The next morning I had a good wash-up and put on my best apparel so that my personal appearance should be more in harmony with the conventionalities of civilization. Two hours' travel on the Southern Pacific Railway brought me again into Tucson. I had no difficulty in getting accommodation at the best hotel, and was treated with much courtesy, but the discomfort of having to sleep within four walls, which a cloudless day had heated up to an abnormal degree, was too much for me. Everything I touched in my room was warm, and I felt as if I were in a Turkish bath with no breath of air to relieve the tension. People in half torpor were lying on their beds with their doors open. The temperature of the air outside was not unusually high, but the house had been built without any regard to climatic conditions. Dwellings for human occupancy in countries where such high temperature prevails should not be constructed as they are in colder regions. This is a very common fault, and people are apt to look upon the discomfort brought about by man's thoughtlessness as unavoidable or to accept it as inscrutably providential. To shut out air and make no provision against a heat wave that lasts for months is not civilization; its aim should be to make everybody independent of exterior circumstances and comfortable in all latitudes. Fond as I am of civilized life and all it implies, as I gasped for air during those restless hours I could not help longing for the fresh, cool, beautiful, and silent nights of my wild desert.

CHAPTER XXII

PHYSICAL AND MENTAL CHARACTERISTICS OF THE PAPAGO—EFFECTS OF CONTACT WITH WHITE MAN—MARITAL RELATIONS—WOMAN'S HIGH POSITION—INDUSTRIES—DIVISIONS OF THE TRIBE—RELIGION AND MYTHS—RACES AND GAMES—FIGHTS WITH APACHES—SHAM BATTLES—PRESENT CONDITIONS AND PROSPECTS OF THE PAPAGO

To the characteristics of the Papago which have already been given, I shall add here some observations and notes which may help to complete the picture of his present status as well as of his past.

These Indians are naturally very healthy and many grow to be a hundred years old or more. A few years ago a woman who went out to gather pitahaya returned with the basket on her head full of fruit and a newborn babe in her arms. The total weight probably was not less than forty or fifty pounds. The heaviest baskets, when loaded with the juicy cactus fruits, may weigh as much as a hundred pounds. A native Indian is less affected by inflammatory processes than a white person; wounds heal by first intention. The following case, although referring to a Pima Indian, may properly be mentioned here, as the Papago are of the Pima tribe. A woman in childbirth was unable to deliver the placenta; but she recovered in a few days, though an American doctor, who saw her, expressed the belief that she would die.

Papago: Guadalupe, my companion from Quitovac

Papago: Miguel, medicine man from La Nariz

Girl

Parents: Chinaman and Yaqui

Boy

Parents: Spaniard and Papago

The men frequently have slight moustaches. At present the men all have their hair cut short, but a luxuriant growth was formerly considered a standard of beauty. It was occasionally washed with an infusion from the roots of a vine called *ádofi*. Sometimes these natives would plaster the head with clay, to kill parasites and ensure a better growth of hair. The women still take great care of this ornament to their persons and are often seen brushing it with brushes made from the roots of sacaton grass. With the children, it is cut so that it may grow strong, and the cut hair is twisted into a cord which is used in tying together parts of the burden basket as well as in the tying of the saddle-bag. Formerly the custom was to leave the children's hair long on top of the head, back of the neck, and in front of each ear. I saw a left-handed man and a left-handed woman in the tribe. If it be permissible to draw any general conclusions from the sound sleep of my companion, Pablo, these natives sleep unusually soundly. One morning, while he was with me, he woke up several yards below his bedding, having rolled down a declivity during the night in his sleep. The Papago avoid eating food hot from the fire.

They possess much force and stability of character, are quick of perception, loyal to the white man that they like, and if in danger do not cry for help. Under her natural bashfulness the woman hides sterling qualities of efficiency in household work, constancy, and faithful adherence to duty. These Indians are industrious and have a remarkably even temper; thirty children may be seen playing harmoniously together, where a similar gathering of small Caucasians would soon result in discord, fights, and tears. The children and young girls have three kinds of chewing gum; the one which is most commonly used has been mentioned already, another is procured from the pod of a vine which comes early and dries in July; by squeezing the pod a milk is secured which when boiled yields a gummy substance. These natives never shake hands; they come and go and are never obtrusive. In the circumstances under which I travelled, I liked that custom; it made me feel independent and equally polite. When an Indian comes to shake hands with me, I know he has changed his mode of life, for one may be sure that he learned that custom from Americans or Mexicans. Their language is not sonorous, as it is full of guttural sounds and half-pronounced syllables. Four is their sacred number.

In the autumn of 1909 there was a mild epidemic of an eye disease among the Papagoes of Sonora as far west as La Nariz. The eyes were red and inflamed, as in conjunctivitis, and the pain evidently was very great. They probably contracted this disease from the Mexicans.

In his changed habits of life, inhabiting houses that do not admit air and adopting clothes that debilitate his magnificent physique, the Papago, when he catches cold, is unable to throw it off in the same way that a white man does. It very often develops into pneumonia and consumption, which awful disease is the scourge of the tribe, nine out of ten deaths being due to tuberculosis. The children bring it from school and even old people die from it, having acquired it through contagion. Although in no way a prison as to its restrictions, nevertheless the school as at present conducted does them harm physically. The confinement to which they have not been accustomed seems to undermine their health. In these days of advanced methods of teaching some remedy for this condition no doubt will be found. One absolutely necessary change is to alter the construction of the school-houses so as to make them sanitary through unlimited access of air. Even the Presbyterian Mission, which has been of considerable benefit to the Indian, has erected outside of Tucson incredibly inappropriate buildings, made of brick and substantial, to be sure, but singularly out of place in the glare and heat of the Arizona desert. Prof. R. H. Forbes, of Arizona University, told me that in the White Mountain Apache school, at White River, ninety per cent of the children have tuberculosis, chiefly glandular. This statement was made to him by the physician in charge. Would it not be better to leave the Indians uneducated than to proceed in this manner?

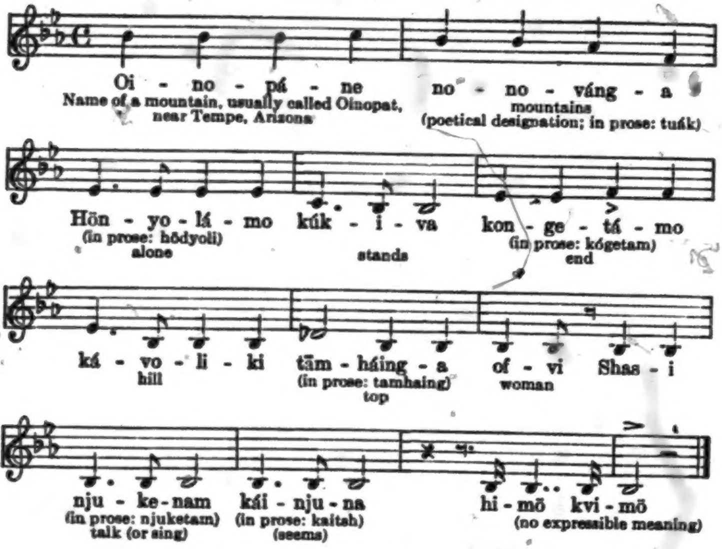
Not long ago the makai (medicine-men) had as many as five wives each, while the usual number for the ordinary man was two. At present it is very rare to find a Papago with more than one wife, and the average number of children in a family is usually no less than eight, but the mortality among infants is great. The position of woman is equality with man. To be sure, the man never carries burdens—that is relegated to the woman's domain—but she is the mistress of the house. She is, in fact, the "boss" of the household and gives her husband as well as her child his portion of food. She is systematic, while the man, in whom the characteristics of the hunter still survive, has little or no order. Her vigilant eyes look after everything and she is consulted in all transactions. The dogs follow the woman and belong to her, the husband rarely speaking to them.

Sometimes a young man will marry a woman more than old enough to be his mother since, under the changed conditions of the tribe, many of the young fellows do not know how to take care of themselves. He may work for an elderly woman who owns cattle and behave so much to her satisfaction that marriage results, and women have in this way been known to make manly men out of flippant youngsters. The children are treated kindly by the parents and are kind to each other.

Formerly a bamboo flute was played by a young man, especially in the evening, to attract the attention of a girl, though the ultimate choice of a partner rested with his father and mother. Up to recent times the sons were obedient to their parents and readily consented to marry the girls picked out for them. A son was instructed how to behave in order to find favor with a nice girl with whom appearances weigh little compared to the noble qualities of being a good hunter, not lazy, and an efficient agriculturist. It is the girl's father who makes the first advances in a matrimonial venture. He talks the matter over with the father of the boy who, however, sometimes may decline. But if the father is able to say that his son is willing, the latter betakes himself to the girl's house and stays there four nights. Her mother then takes her to the bridegroom's home and leaves her there. No services of the medicine-man are necessary; if they mutually agree to live as husband and wife, they remain in the house of the young man's father until the latter's death. The son may make a house for himself near by, but he helps his father in his work. If the girl does not like the boy, she may walk back to her parents. Conferences between the fathers will then ensue to try to adjust matters and, until recently, sometimes the

PIMA SONG

USED WHEN THE YOUNG GIRLS COME OF AGE

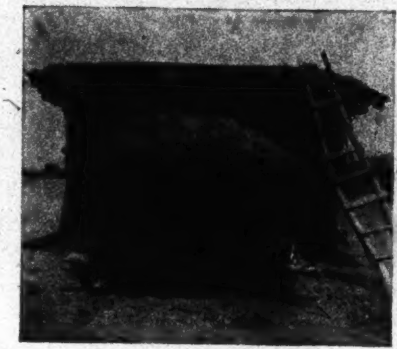

Oi - no - pá - ne
Name of a mountain, usually called Oinopat, near Tempe, Arizona
no - no - váng - a
mountains
(poetical designation; in prose: tuák)
Hön - yo - lá - mo
(in prose: hödyoli)
alone
kúk - i - va
stands
kon - ge - tá - mo
(in prose: kógetam)
end
ká - vo - li - ki
hill
tām - háing - a
(in prose: tamhaing)
top
of - vi
woman
Shas - i
nju - ke - nam
(in prose: njuketam)
talk (or sing)
kái - nju - na
(in prose: kaitsh)
(seems)
hi - mö kvi - mö
(no expressible meaning)

This song may still be heard among the Papago, *e. g.*, at Ánekam rancheria in Santa Rosa valley, but it originated from the Pima.

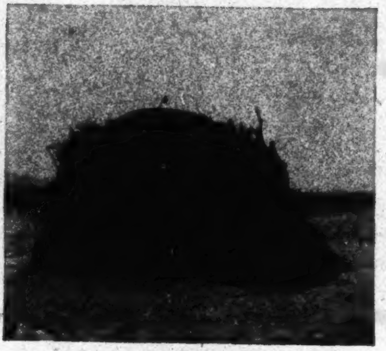
father of the girl would decide to whip her with a rope of rawhide to bring her to the proper way of thinking.

Certain periods of female life are looked upon with awe, even by the civilized Papago. If a hunter touches a woman at these times he will have bad luck or contract some disease. Formerly a girl in this condition could not touch her hair. If she wanted to scratch herself, it would have to be done with a stick, and even her brother could not touch his hair. When the girls come of age, dancing and singing are kept up for many nights in succession in a very fatiguing fashion, as neither rest nor food is taken. No intoxicating drinks are partaken of, and one marvels at the exertions that primitive man finds it necessary to undertake in order that the girl may be started right in life. Formerly these ceremonies, each time lasting four nights, had to be performed on four occasions, and even thus the girl has to go for a few days' seclusion to the *hohólikaki*, a house specially set apart for women considered temporarily impure. The dancing on such occasions consists of a forward and backward rhythmical movement of two rows of men and women facing each other and at the same time slowly moving in a circle. The participants hold each other by the hand, and the movements are in time with the singing, four steps forward and four backward. In Quitovac where the Indians have been much influenced by the Mexicans, although they have given up the dancing part of the performances, the singing is kept up for eight nights or more in succession.

When the woman feels that her hour is approaching,



Pima granary. Made from twisted arrow bush



Hut for the isolation of women

Papago: "Rainbow," from La Nariz

she takes up her abode in the hohólikaki where she remains for over three weeks. She bears her child *accroupie* assisted by her mother or elder sister; sometimes an elderly woman is specially chosen for this, acting as midwife. Formerly, for six days thereafter, the food was made for the mother and brought to her, the diet for the first two days consisting of *atole blanco*, a kind of thin gruel made of maize or sometimes wheat, mixed with the seeds of the sahuaro fruit. Now, in imitation of Mexican custom, the period is extended to twenty days. The husband during this time uses a different gourd from the rest of the family when he drinks water.

Twenty days after the wife has returned from her seclusion the medicine-man comes to the house to give the baby clay to eat and present it with a name. The clay has the same name, *pit*, as that used in pottery making, and it does not look in anywise different. In the afternoon, after having mixed a small quantity with water and placed the mixture in a sea-shell on the ground, he takes up a position east of it, while the parents, with the infant, stand to the west. He walks four times toward them, the last time hooting low like an owl. The parents have to take the drink first, then the baby. If the child is male, the medicine-man gives it to the mother first; if it is female the father drinks first. In administering the drink to the child, he also gives it a name, which the grandparents previously have agreed upon; with his eagle plumes he makes passes over the infant, and with the same object sprinkles some of the water on its chest, shoulders, and back. The advantages which the child gains are supposed to be health, strength, and luck; untoward happenings are also prevented even to the family itself. If the birth occurred in the season of thunder-storms, the danger to the child, or a near relative, of being killed by lightning will be averted. For four days after the ceremony the parents abstain from eating salt and jack-rabbit meat, and they must not do much work; the father cannot hunt.

The natural characteristic of the Papago is to be virtuous. According to Indian reports, a woman caught in adultery used to be punished with death. In recent times whipping has been the penalty and the custom of killing her animals still prevails. The tribe has been notably stable in racial qualities during centuries of contact with whites. Intermixture to-day rarely takes place except in Sonora, where the Mexicans have taught the Indians new customs. In the out-of-the-way places of southern Arizona a few Americans are known to have Papago wives; they have children and to all appearances are known to lead happy lives, for the lady of the house is intelligent, quite good-looking, clean, and very industrious. During my stay at Sonoita several couples came to be married by the civil authority there.

Murder was left to the family of the murdered person to punish. From an American who speaks their language and lives in the central part of the Papagueria, I received what I must accept as reliable information with regard to unnatural vice, which perhaps may be more or less restricted to that locality. Several startling instances were told me by him and also by a trustworthy Indian who was present. Even a married man with full-grown daughters was subject to this depravity. One young Indian wanted to dress like a woman, but was prevented by his father. A Pima Indian, after losing his wife, had a healthy child by his daughter.

In regard to the industries of the tribe, attention has already been called to pottery making. Weaving was formerly practised on a loom lying on the ground, but the art is now lost. The Papagoes, as well as the Pimas, are somewhat noted for their basket work, though neither of them is as clever as the Apache in this respect. They make trays and bowl-shaped ware for household work and also some large, deep, water-tight baskets which, from their principal use, may be termed sahuaro baskets. In these is gathered the juicy fruit of the sahuaro; the sirup and water are mixed for wine making and the wine itself is offered at the festival. They are rare at the present time. Women are the basket makers and in the best ware the white material used is produced from strips of young willow shoots, while the pods of the *martynia* (devil's claw), split in two, furnish the black part of the texture. The good workmanship of old is falling into decline, and the significance of the decorative designs is almost entirely forgotten. There is only one woman at the present time who is able to do first-class basket work, and she cannot tell what the designs mean. In Sonora the making of basketry has ceased to exist.

Granary baskets are still in common use in the Santa Rosa valley. The large ones are made inside of the house, the small door-opening preventing their removal. The material of which they are made was formerly a certain grass, which may still be used, though generally wheat straw takes its place. Strips of mezquite bark are employed in the binding. The granary basket has a flat cover, made in the same way, which is sealed with mud. Sometimes it is plastered throughout with mud as a protection against rats.

The pleasing designs seen in the old baskets are rapidly disappearing on account of the deplorable lack of æsthetic sense among those who are eager to buy Pápago baskets. The makers are actually encouraged to insert crude representations of men and beasts in preference to the former beautiful conventionalized designs which the innate artistic sense of the Indian had evolved. The trader also teaches the Papago to make the baskets quickly and cheaply, in order that more money can be made in the market from ignorant buyers. A society for the preservation of aboriginal American art is of urgent need and should be attempted even at this late day.

It is difficult to ascertain anything about the origin or early history of the tribe, beyond the traditions that the people when returning from across the sea left ceremonial sticks at Caborca, Quitovaquita, and Santa Rosa.

The tribe is divided into five groups, descent being in the male line. Their names have lost all meaning; two of the groups (*mam* and *vav*) are known as red-velvet ants (*vöki ´óbimal*) and three (*ókul*, *ápap*, and *ápki*) as white-velvet ants (*ˢtóa óbimal*).* Any animal that has red about

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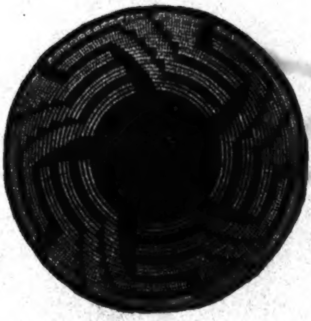
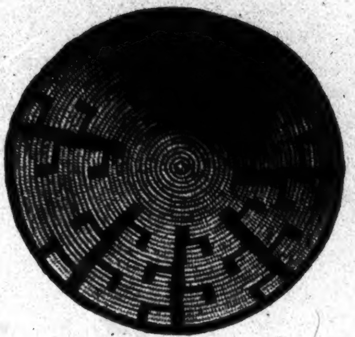
* The so-called velvet ants are females of certain wasps (of the family *mutillidae*).

a. Dog tracks

b. Turtle



c. Martynia



d. Sahuaro

e. Juice falling from the sahuaro fruit; arrow points

f. Meaning unknown

DESIGNS OF PAPAGO BASKETS

[illegible]

it belongs to the red people. Members of salt expeditions formerly painted on their faces the color of the division to which they belonged. The red people were, according to mythical tradition, the original owners of the country, but Elder Brother, *Síbu*, having been ill-treated by them, brought the white people from the underworld and after many big fights the red ones were almost exterminated, and even to this day they are fewer than the white groups. Much in the minority are those families whose children address their father as *mámekam* or *vávekam*. The rarest of the groups is *vav*, and the most common, *ápki*. The mounds are attributed to the red people.

The rancherias appear to have a division of their own, that part of the Papagueria which is comprised within Arizona being divided into four provinces. Probably the present District of Altar is included in one of them. These subdivisions are:

I. *Ánekam* (name derived from a leguminous tree, *an*) consists of the rancherias Ánekam, Kukómalik, and Tjúupo; in other words, the upper part of Santa Rosa valley as far north as the Kohatk people, who are Pimas.

II. *Hobóla* (meaning of the word unknown) is the north-western part of the Papagueria. These people extend west of the Quijotoa range as far as Gila Bend, including Aktjin rancheria, four or five miles south of the modern Maricopa railroad station. Their original starting point is said to have been Cacate rancheria and includes such rancherias as Pozos Muchos, Sauceda, Pozo Blanco, and Barajita.

III. *Tótokvan.* ("Those who wear loose breech cloths." *Tókvan,* something loose. The designation alludes to the habit of the people of this section of using long or loose loin cloths or breech cloths, different from those worn by the other groups. They are at present more frequently called by the nickname *kíkima,* smart ones.) This section comprises most of the Santa Rosa valley, the Comobabi range, and extends east as far as San Xavier, which place was settled mainly by people from Santa Rosa. This is, roughly speaking, the north-eastern part of the Papagueria.

IV. *Kokeloroti* (Indian rendering of the Mexican *Tecoloteros;* from *tecolote,* owl). Their original name is *Tjukutkokam Kíkam,* "owl's cry inhabitants." *Tjúkutko,* owl's cry; *tjúkut,* owl, and *ko,* cry; *kikam,* inhabitant, derived from *ki,* house. These people are said to have started originally from the rancheria Tecolote, in Papago Tjúkutko, and extend from Indian Oasis southward, comprising such rancherias as Fresnal, Kõxikux, Tecolote, Sépanovak, and Pozo Verde. This section is approximately the south-eastern part of the Arizona Papagueria, and, according to the information of a Papago otherwise trustworthy, also includes the Mexican Papagoes.

Although the Papago, as we have seen, have elaborate dancing festivals, their religion is not regulated by exterior observances to such an extent as is the case with many other Indian tribes, as, for instance, that of the Pueblo Indians, or of the Huichols of Mexico, whose whole life is ruled by ceremonies and symbols. Many still pray to the sun, which they call father. The deities most mentioned are Elder Brother and Earth Magician. The first of these is known under two names, Íitoi, which means "to drink it all," and Síhu, which was given him after the deluge, when he was the first to land. He helped Earth Magician at the beginning of time to bring order out of chaos, and may thus be termed the creator jointly with him. He created deer and other animals as well as the trees that bear fruit, making strong roots to hold the trees. He was a great singer. As we have seen, Baboquivari peak and Pinacate belonged to him, and here sacred caves, in which he was supposed to dwell, were devoted to his worship.

In their creation myths there are divergencies, as may be expected. One version begins:

"In the beginning was Sky and Earth. Sky came down and embraced the Earth."

Another is rendered thus:

"In the beginning the world was all darkness and all the time everything was moving around. In that time there was born a child Tjívurt makai, Earth Magician, and he began to consider what to do to make the world quiet. He took up some earth, mixed it with water, and made a round flat cake which he put down on the world to calm it, but it was of no avail, for the earth kept on moving around. He tried to steady it, moving it back and forth, and in doing so he separated the earth and the sky. A noise was heard and another child was born, who was Íitoi. He came to Earth Magician who asked him where he was born. 'Earth is my mother and Sky is my father,' Íitoi answered. 'Help me to put the world in order,' Earth Magician asked him. Íitoi consented to this. They made the sun, the moon, and the stars, and then in their light they set to work. Earth Magician took two small beads of perspiration, which he changed into two spiders which walked around the world four times, tying the earth and the sky together at the edges.

"Then the two magicians made people out of earth and water, but they turned out to be bad and fought and killed each other. The makers turned the world over and made new people, who also killed each other. Four times in that way they made and unmade their work. 'There is something bad in the world,' they said. Earth Magician went around making holes with his stick. Blood came up and washed the earth, and they created new people. But Earth Magician's people were queer —some with one leg, others with big ears. Íitoi became angry over this and disowned them. Earth Magician also was angry and went to the underworld and stayed there. Íitoi remained here among his people singing, but they did not like him and killed him on four occasions, and each time he would be walking about again the next day."

Characteristic of their social life are two kinds of races, eight different games for men and three games for women. The games still flourish but the races are on the point of disappearing. The most important of the latter is a foot-race, run by two men, in which a ball usually made from mezquite wood is kicked along by each contestant. The ball must not be touched by the hand. One or two men on horseback assist the racers in finding the balls and give them new ones in case their own break or accidentally are lost. The last great race of which I heard was given, eighteen years ago, east of the Quijotoa Range. According to a Mexican from Quitovac who was present, the Indians had brought herds of cattle, mules and horses, clothing and money, all to serve as betting stakes on the occasion. Fifty odd Indians kept admirable order. The two runners, who were nude but for a cloth around the loins and with a bandanna tied around the head, started northward early in the afternoon in the direction of Santa Rosa rancheria. They ran seventeen or eighteen miles before turning back. One of the runners became tired, which finished the race; then the assistants picked them up, giving each of them, in Mexican fashion, a seat behind the saddles of their horses, and in that way they returned to the starting point after dark. The winner was about thirty years old; the other, about fifty, had some gray hair. If my informant was correct, thousands of dollars were lost in bets. The Barajita rancheria alone came out two hundred animals short, and the Pozo Verde loss was no less. Many of those who lost had staked all their live-stock and the women wept. A race of less importance took place in the same region some seven years ago.

The Papago, as well as the Pima, was able to cope with the fierce Apaches more efficiently than were the Spaniards and Mexicans. The young men were trained from childhood for future combats with the enemy. It must not be forgotten what a part the supernatural plays in the Indian's life; cure for disease is sought less in remedies than in magic devices, and combat with an enemy means first of all a fight of magic with magic. Once, as one of their tales goes, an Apache was completely surrounded, but the Papagoes feared to attack him until one of them stepped forward carrying his shield with its symbolic inscriptions and supposed magic effect. The Apache fired his rifle at him, but missed his aim because he was overcome by the shield's magic power, which even split his thumb, so that he could not fire straight. This was ascertained by the Papagoes when examining the body of the Apache afterward. Nevertheless, the education of the boy included as a matter of course ability to handle arms and the mastery of all that pertained to making a good warrior. In the nightly meetings at the council house, he was taught, besides, how to practise for the races and how to hunt. A considerable amount of sane advice would be imparted to the young man, and I cannot refrain from quoting here the late Mr. Frank Russell in his recent memoir* on the Pima Indians, from whom the Papago segregated long ago. He describes the exhortations of a Pima father to his son in the following manner: "If you are wounded in battle, don't make a great outcry about it like a child. Pull out the arrow and slip away; or, if hard stricken, die with a silent throat. Go on the war trail with a small blanket. It is light and protection enough for one aided by the magicians. Inure yourself to the cold while yet a boy. Fight not at all with your comrades; preserve your strength for the combat with the Apaches; then, if brave, will come to you high honor. Be unselfish or you will not be welcome at the fire of the friendly; the selfish man is lonely and his untended fire dies. Keep your peace when a foolish man addresses the people. Join not in his imprudent counsellings. Above all, talk not foolishly yourself. Bathe in the cold water of the early morning, that you may be prepared for the purification ceremony after killing an enemy!"

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* *Twenty-sixth Annual Report of the Bureau of American Ethnology,* Washington.

When an Apache campaign was decided upon, there was much preparation for the fray, and the feasts and ceremonies connected with the return of a victorious party were among the most elaborate, foot-races and gambling forming a part. If the Apaches killed some of the Papagoes, the former were believed to take the clouds away, so the Papagoes had to go and kill some of them in order to bring the clouds back. Sometimes the Apaches would be discovered in a week, and sometimes a whole month would pass before the encounter. The provisions consisted of pinole; bows and arrows, lances and clubs were the weapons, and almost every one of the party had a shield. The Apaches have been credited with a superstition about fighting at night, and the Pimas at least are said to have used this disinclination to their advantage. On returning, those who had killed Apaches had to stay away from their houses and bathe early in the morning before sunrise four times at intervals of four days. One man was appointed to provide them with water and food, of which they partook sparingly. Meat and salt were forbidden. He would come by night and they would smoke tobacco together. The first night was spent in dancing. After sixteen days' seclusion in this manner, the feast would come off, but the dieting and abstention on the part of the slayers lasted sixteen days more. If a man had killed an Apache before, he did not need to go so far away from the house or be so rigorous in his diet as the inexperienced young man.

Sham battles used to be a prominent feature in the social life of the Papago. The last one was given five years previous to my visit to Ánekam in the Santa Rosa valley and there was some talk of having one again in the near future. In these sham battles dummies of straw are placed in the mountains, sometimes at a distance of a two days' excursion. In the evenings before the attack the men sit for a while in a large circle, their weapons lying in the centre, but they soon disperse around the different fires to sleep, while some of them watch. Somebody goes ahead and makes a big fire near the dummies, and the attack begins at dawn. Four men have been chosen to kill the dummies, only one, who leads, carrying a shield; they all have feathers attached to their hats or to specially made leather caps.

On their return there is dancing for four nights and singing; the dancing is similar to that of the sahuaro feast. Some of the men, who are well paid by general contributions, play the part of those who kill Apaches, imitating their actions; one of them carries a shield and the rest have ordinary weapons. The four who killed the dummies keep away from the dancing place until the last night. They fast, and must not drink water. Pits are made in the ground, a hundred yards or more away, which are a foot deep and wide enough to hold a man sitting with legs crossed. Here the four warriors have to sit immovable during the whole night, holding the scalps of the supposed Apaches, and care being taken that they do not face either the sun or the moon. Special songs are sung for these men. One man looks after them, and they are under so much restriction that they cannot scratch their heads or any part of their body with their hands, but have to apply a small greasewood twig if the necessity arises. Their wives, who also fast, sit in pits behind their husbands. After the dance is over the four men still have to keep up the taboo and dieting four days longer; then they bathe, and when they go to sleep many songs come to them in their dreams. Among the Pimas, when the warrior had killed an Apache, his wife made a tray, with a large svastika design interwoven.

The primitive condition of Papago society is giving way to the new, but not without a jar. In old times in the house of a prominent man, with his four or five wives, no quarrels would arise. When his household was increased by the additional families of his sons who, according to ancient custom, made their homes with him, the serene atmosphere continued; there was no question of mother-in-law, or other disturbing factors, in their nicely adjusted relations. The families were large and peace and harmony reigned, but now all that is changing. The Indian who has to work for his living finds it hard to make ends meet, and to support additional people becomes impossible, hence quarrels and unpleasant conditions begin to manifest themselves.

Formerly they lived in large rancherias, but in the last twenty years the tendency has been to scatter. They have been touched by commercialism and are now showing energy in acquiring cattle and other property. Formerly, too, a family owned a couple of cows and a horse or sometimes they had no animals, but during the last twenty years the tribe has acquired a considerable number of live-stock, often twenty cows and from ten to twelve horses to a family. Four or five families are the individual possessors of a few hundred head of cattle, but there is no difference in their mode of life from that of the rest.

The women are clever in adapting themselves to the new conditions. I know of an instance where the wife made a shirt for her husband without ever having learned how to cut it out, and the garment, when finished, was very creditably done. What the girls desire most to acquire at school is the knowledge of music and dressmaking. Some of them have learned at the Presbyterian schools to play the piano, which redounds much to the credit of the schools. To develop man's sense for harmony and the beautiful, whether by music or other refining pursuits, is as important as to teach him to read and write.

The Papagoes recognize the white man's superiority and have begun to make money an aim in life, which may be the necessary step for their further advancement. They have adopted civilized man's mode of dressing, his tools, vessels, and implements, sewing-machines, and even phonographs, bacon, bread, and coffee, and all the different brands of crackers and canned goods. Their ideas and manners are naturally changing. One prominent Papago complained to me that the women were gossiping now as white women do. These Indians still insist on speaking their own language, but they might just as well give it up, as they no longer preserve their traditions and ancient customs. The future augurs well for the Papago as long as the government's wise prohibition against the sale of alcohol continues to be rigidly enforced. There is no trouble in civilizing the Indians by education, but a great step in the right direction would be to civilize the rough whites first.

APPENDICES

APPENDIX I

SHORT VOCABULARIES FROM THE LANGUAGES OF THE PAPAGO, PIMA, AND COCOPA INDIANS

ǥ is pronounced as *th* in *think*.
l̄ is pronounced with a thick sound, almost as *r*.
x is to be given the sound of the Greek χ.
A letter placed as the *s* in *ˢtóa* is pronounced faintly.

In the Pima language only those words which are different from the Papago designations are indicated.

ENGLISH	PAPAGO.	PIMA.	COCOPA.
1 man.	tsiótsh.		ápa.
2 woman.	ófvi.		njesák.
3 boy.	viapókuli.		kuxumík.
4 girl.	tjúxjia.		nirshhá.
5 infant.	ál̄i.		kvemék.
6 my father (said by son).	nioók.		enikú.
7 my father (said by daughter).	nioók.		enjiá.
8 my mother (said by son).	ntjú.		intjá.
9 my mother (said by daughter).	ntjú.		intjá.
10 my husband.	nikún.		inkuriák.
11 my wife.	nihónik.		visvéy.
12 my son (said by father).	niál̄itak.		xomá.
13 my son (said by mother).	nimát.		shaáu.
14 my daughter (said by father).	niál̄itak.		epǥa.

15	my daughter (said by mother).	nimat.		shaáu.
16	my elder brother.	nisis.	kö^{o}tju njuvöanak.	kasá.
17	my younger brother.	nishúupitsh.	á͡litju njuvöanak.	nixhúl.
18	my elder sister.	nisis.	kö^{o}tju ófvi njuvöanak.	kasá komtjavíl.
19	my younger sister.	nishúupitsh.	á͡litju ófvi njuvöanak.	nixhúl tjómkvas.
20	an Indian.		óotam.	metjapái.
21	people.	húmatshkam.		
22	head.	mo.		mukkúr.
23	hair.	mo.		ámuxvāl.
24	face.	voihosha.		ijú.
25	forehead.	koá.		lxemeá.
26	ear.	naak.		shmal.
27	eye.	wi.		ijú.
28	nose.	taak.		ixhú.
29	mouth.	tjin.		ijjá.
30	tongue.	njúun.		ennjipāl.
31	teeth.	táatam.		ijjá evví.
32	beard.	tjínjevo.	öshpo.	ijjá lemírsh.
33	neck.	kósevo.		amapúk.
34	arm.	nóvfi.		ishá^{i}l.
35	hand.	nóvfi.	máshua.	ishá^{i}l.
36	fingers.	mámitjpot.	maúshötkik.	ishá^{i}l kusheráp.
37	thumb.	kúutjo.	kú^{i}tjo maúshötkik.	
38	nails.	hóotsh.		lkaxváu.
39	body.	tjúohok.		immátj.
40	chest.	pásho.		axtikkár.
41	belly.	vok.		itjú.
42	female breasts.	vípi.		

ENGLISH.	PAPAGO.	PIMA.	COCOPA.
43 leg.	káxiok.		em^{a}shíl.
44 foot.	tat.		immí.
45 toes.	mámitjpot.	tártshötkik.	immí kusheráp.
46 bone.	óo.		eniyák.
47 heart.	íbetak.		iyái.
48 blood.	úurt.		níxwat.
49 town, village.	kíhim.		^{o}hwá.
50 chief.	ósakakam (osáka = rod), also: ku (big).	tekúatshik.	
51 warrior.	sáhamakam.	hatjúik kiátam.	hxvá oskanyás.
52 friend.	náwatsh.		innjél.
53 house.	ki.		^{o}hwá; ^{o}hwa tsavíp (buried) is the designation for a house made of arrowbush and covered with earth.
54 kettle.	kóhiwone tákut (kóhiwo = boil, tákut = implement).	háa (olla).	klumás (olla).
55 bow.	káat.		ítjim.
56 arrow.	hápot.		ípa.
57 axe, hatchet.	hása.		sakárt.
58 knife.	váinom.		^{o}whí.
59 canoe.			ígelhu (boat of Mexicans). Kúpap, float, made of tule ("bulrushes," *typha latifolia*).
60 moccasins.	teva or shoesk (probably not original); sandals = kaika shoesk.		xamináu.

61 pipe.		tjúinikurt.	mõkwín (Mexican pipe). Úup (tobacco) njáasas (reed) is the name for native cigarette.
62 tobacco.	viv.	víhuvĭ.	ūp.
63 sky.	tetámokatshim (tetam=our (te) top (tam), kátshim=that lies prominent).	támaitjam.	mā.
64 sun.	taʳs.		ᵉnjá.
65 moon.	ḿarsat.		xtlá.
66 star.	hóo.		kúxlkjap.
67 day.	taʳs.		ᵉnjám.
68 night.	tjúhok.		sinjám.
69 morning.	síal͡im.	máasi (séalam, to-morrow).	njáak.
70 evening.	hótonak.		netxáp.
71 summer.	tónjapk (heat).		ᵉnkipíl.
72 autumn.		tjókiapk.	
73 winter.	sööpk̲ (cold).		xesúr.
74 wind.	hóivol͡i.		etxá.
75 thunder.	pöopotk.	toáhem.	shukír.
76 lightning.	vöxpöki or vöpöki.		shuulám.
77 rain.	tjúoki.		ikwí.
78 snow.	kuv.		saᵗniél (snow fell).
79 fire.	tai.	náata.	tlumár.
80 water.	shóotak.		xĩ.
81 ice.	kuv.		sesemís.
82 earth, land.	tjíuvurt.		mart.
83 sea.	katsk.		xarseíl.
84 river.	ákimal͡i.		xawíl.

ENGLISH.	PAPAGO.	PIMA.	COCOPA.
85 lake.	vámul̄i.	hötjulko shóotkam.	xinjú.
86 valley.	vóoshan.	sháakik.	
87 plain, llano.	tjuk.		metár.
88 hill, mountain.	kávol̄ik.		wi (stone, rock) manyú (high).
89 island.		síkuli tjúurtkam.	wixaktjul.
90 stone, rock.	hótai.		wí.
91 salt.	ōn.		eshír.
92 iron.	váinom.		
93 forest.	súosik.		pit.
94 tree.	ōs.		
95 wood.	kóak.	óos.	
96 leaf.	háhak.		^{o}val.
97 bark.	úl̄itak.		shuyél.
98 grass.	váshai.		shmal.
99 pine.	hok.		
100 maize.	hóin.		^{a}ktjás.
101 squash.	háal^{l}.		xamitsá.
102 flesh, meat.	tjúokuk.		kikvái.
103 dog.	koks.		xart.
104 bear.	tjótum.		tumá.
105 wolf.	shúu.		
106 fox.	gáso.		martkevá.
107 deer.	¢iik.	hwei.	akkvák.
108 mountain-sheep.	tjúrsa.		^{e}mmó.
109 beaver.		kóve.	
110 rabbit, hare.	tjúov.		xalxá.

111	tortoise.	kómaktjert.		xnjar.
112	horse.	kávio (*caballo*).		^{a}kwáks.
113	fly.	móalī.		shlimú.
114	mosquito.	vámok.		shimpúl.
115	snake.	vámat.		
116	rattlesnake.	kóoi.		awí.
117	bird.	óovik.		^{e}shā.
118	egg.	nónha.		shoáp.
119	feathers.	áan.	vópo.	shavál.
120	wings.	húukatsh.	aán or hök.	njurvír.
121	goose.			shimkoá.
122	duck (mallard).	vápkaik.		shaniyáslepasáb (niyá = mouth; slepasáb = wide).
123	turkey.	tóva.		urút.
124	pigeon.	hóji.	ókok^{oi}.	ilkú.
125	fish.	vátop.		sifl.
126	name.	tjúukik.		^{u}mul.
127	white.	^{a}tóa.		xamál.
128	black.	^{a}tjuk.		nihl.
129	red.	suvök.		xoát.
130	light blue.	stjúutak.	stámain.	xapsú.
131	yellow.	suvám.		^{a}kwars.
132	light green.	stjúutak.		xapsú.
133	great, large.	ku.		p^{e}tái.
134	small, little.	tjúm.	hláasik.	ltjas.
135	strong.	sukúvök.		shepakinám.
136	old.	kölī (man), thing: hökjokam.		kuruák.
137	young.		vörtjutsh.	kviyunúk.

ENGLISH.	PAPAGO.	PIMA.	COCOPA.
138 good.	skúukatsh.	sāp^{a}.	pvai.
139 bad.	pi kúukatsh.	peáp^{a}.	xaták.
140 dead.	móki.		mushupá.
141 alive.	tóakam.		yupárt.
142 cold.	súupi.		tūr.
143 warm, hot.	^{a}ton^{i}.		lxáp.
144 I.	áni.		njāp.
145 thou.	ápi.		mapún.
146 he.	húkai.		nirshán.
147 we.	átjim.		njápa.
148 ye.	ápim.		mapúsa.
149 they.	húkam.		nirshán.
150 this.	íita.		pin.
151 that.	húkai.		shun.
152 all.	vö^{r}s.		sámel.
153 many, much.	mói.		ninjám.
154 who.	húdai.		maká^{i}n.
155 far.	mörk.		kur.
156 near.	pi mörk.	meá.	xarpái.
157 here.	íija.		upái.
158 there.	ámai.		shūl̄.
159 to-day.	itta^{r}sh.		njápum.
160 yesterday.	táko.		sinyár.
161 to-morrow.	síalim.		njákam.
162 yes.	hæo.		ií.
163 no.	piá.		láxem.
164 one.	húmako, sometimes: máto (in counting).		ushít.

165	two.	kok.		xuvök.
166	three.	vaik.		xamúk.
167	four.	kíik.		supöp.
168	five.	hútasp.		sheráp.
169	six.	tjóotp.		xamxúk.
170	seven.	vövak.		paxká.
171	eight.	kíkik.		supxúk.
172	nine.	hómokt.		xamxamúk.
173	ten.	vörstomam.		shahúk.
174	eleven.	vörstomam kámai húmako.		magshít.
175	twelve.	vörstomam kámai kok.		magxuvök.
176	twenty.	koko vörstomam.		shahúk vök.
177	thirty.	váiko vörstomam.		shahúk muk.
178	forty.	kíiko vörstomam.		shahúk supöp.
179	fifty.	hútaspo vörstomam.		shahúk sheráp.
180	sixty.	tjóotpo vörstomam.		shahúk xamxúk.
181	seventy.	vövako vörstomam.		shahúk paxká.
182	eighty.	kíkiko vörstomam.		shahúk supxúk.
183	ninety.	hómokto vörstomam.		shahúk xamxamúk.
184	one hundred.	ciento.		shahúk shahúk.
185	to eat.	ho.		max.
186	to drink.	ī.		sirx.
187	to run.	mö^{r}.		^{e}skiyúę.
188	to dance.	kúihi.	votjúot^{a}.	īmáx.
189	to sing.	njúi.	vonjíoi.	sīyáx.
190	to sleep.	koi.		shemmáx.
191	to speak.	njo.		kvarkvár.
192	to see.	njúi.		wīx.

ENGLISH.		PAPAGO.	PIMA.	COCOPA.
193	to love.	tátjua.		
194	to kill.	m^{o}á.		panák.
195	to sit.	táxiva.		apuváx.
196	to stand.	kúkiva.		apuá.
197	to go.	hih.		āx.
198	to come.	tjívia.	vohih.	puyí.
199	to walk.	him.	vohih.	apaaúx.
200	to work.	tjíkpö.		nawirár.
201	to steal.	u^{4}s.		valísh.
202	to lie.	íatok.		asunéy.
203	to give.	ma.		akíx.
204	to laugh.	xúxum.	vohö.	auséy.
205	to cry.	shósha.		uúkx.

APPENDIX II

RANCHERIAS, PRESENT AND PAST, OF THE PAPAGO

WITH INTERPRETATIONS OF THEIR NATIVE NAMES

I HAVE found it convenient to treat Arizona and Sonora separately. The division into winter and summer rancherias has been maintained, although it is sometimes difficult to make a strict distinction. Instead of winter rancheria I use only the word "rancheria," which comprises in the list, as indeed also in actuality, especially the winter habitations, including also at times permanent abodes.

The words "summer rancheria" designate the temporary habitations resorted to for the purpose of agriculture during the capricious showers of the summer. The Indian name for summer rancheria is *oóitak*, field for cultivation (*milpa*). The common Mexican expression for this kind of ranch, both in Sonora and southern Arizona, is *temporales*, which means ranches dependent for their water upon showers, a Spanish-Americanism, also used in Peru. (Bandelier.) *Rancho de temporal:* "ranch of rain-storm" is the name for a single ranch of this kind. "Winter rancheria," used in the above sense, is indicated by the letter *r*; "summer rancheria" by the letter *s*.

The four Pima rancherias of the Koháttk people are given at the end of the Arizona division. At the end of the Sonora division will be found the names of the principal camps of the sand Papagoes (*areneños*).

I.—ARIZONA

Aaivónam, Rancheria. "Both Sides Hat." (*Áai*, both sides; *vónam*, hat.) A mountain there looks like a hat, seen from either of two sides. South-west of Santa Rosa, *s*, in the Quijotoa Range, near Brownell.

Áktjin, Summer Rancheria. "Arroyo Mouth." (*Akⁱ*, arroyo; *tjin*, mouth.) Two and one-half miles south of *Mákumivóoka, r.*

Áktjin, Rancheria. Three or four miles south of Maricopa railroad station.

Ál̃itjukson, Summer Rancheria. "Little Tucson" or, more correctly, "At the foot of (*shon* or *son*) small (*ál̃i*) black (*tjuk*) hill." Three miles from Artesa Range, on the north side of the road between Indian Oasis and Fresnal, *r.*

Ál̃oitak, Summer Rancheria. "Little Field." (*Ál̃i*, small, child; *óitak*, field, milpa.) Two miles south-east of Santa Rosa, *s.*

Ánekam, Summer Rancheria. "Where the *an* tree grows." (*An*, a slender tree, belonging to the *leguminosæ*. It has long leaves and pink flowers; may possibly be the desert willow.) Half of the people are from Tjúupo, *r.*, in the north-west.

Aquimuri, Rancheria. In Papago, *Akimuri* ("River," "Arroyo"). East of La Nariz, *r.*, Sonora, Mexico, three miles inside of the boundary line. Three or four families live here. There is a pond here.

Barajita, Rancheria. In Papago, *Tonóka* ("Knee"). Situated on the east side of the Ajo Range, five miles from the northern point, near the range.

Bates's Well, also called Growler Well or *El Veit*. In Papago, *Tjunikáatk* ("Where there is sahuaro fruit." *Tjúni*, sahuaro fruit). Twenty miles (seven leagues) north of Quitovaquita, *r.* Some of the former sand people live here. At present this is a mine and store, a few Americans residing. Good well.

"*Bitter Well*," Rancheria. In Papago *Sivváxia*. (*Siv*, bitter; *váxia*, well, waterhole, also spring.) Two miles east of the Vekol mine. Four to five families are said to live here.

Brownell, mine, store and post-office in the Quijotoa Range, eighty miles west of Tucson. (*See* Aaivónam.)

Cacate, Summer Rancheria. In Papago, *Káka* ("Clearing"). South-east of Gila Bend and west of Vekol mountains, about thirty-five miles west of *Kohátk* (Pima). The population, according to information given me by Mr. T. Childs, of Batamote, is about two hundred, old and young, and is much mixed.

Cajilon, Rancheria. In Papago, *Áakta* ("Horn lying." *Aak*, horn). Fifteen miles south of the Vekol mine. This is an old rancheria, now probably abandoned, the former inhabitants living in Cacate, *r.*

Charco de la Piedra, Temporales. In Papago, *Hotashónevo* (Pond at the base of the rock." *Hŏta*, stone, rock; *shon* or *son*, base, at the foot of; *vo*, pond). Twenty to twenty-five miles west of Pozo Blanco, *r.* Indians come here from Pozo Redondo, *r.*

Comobâbi, Rancheria. In Papago, *Komváxia* ("Well where the *kom* tree grows." *Kom*, tree with red berries, called *cumaro* in Spanish; *váxia*, well (Spanish, *pozo*), or a hole dug in the sandy bed of an arroyo to reach water, also spring. If it were the tree's well, then it would be called *Komváxiak*). In the Comobabi mountains, seven miles distant from Kavváxiak.

Covered Well or *Pozo Tapado*, Rancheria. In Papago, *Maish*^{p}*vaxia* (*maish*^{p}, to cover; *váxia*, well, waterhole, also spring). Fifteen miles west of Indian Oasis; one and one-half miles west of *Tjiuvak*, *r.* Inhabited by ten or twelve families.

Coyote, Rancheria. In Papago, *Pantak* ("Where the coyote is." *Pan*, coyote). In the northern part of Baboquivari Range. Situated two miles south of the road when at two miles' distance from Maishe's Well.

Cubo, Temporales. In Papago, *Kuvo* ("Big Pond." *Ku*, large, big; *vo*, pond). It is five miles south-east of Barajita, *r.*, twenty to twenty-five miles south of Ajo copper mine, and about the same distance north-west of La Nariz, *r.*, Sonora, Mexico. This is a large summer rancheria on the llano. Indians come here up to the number of one hundred and fifty souls from the rancherias Sauceda, Cacate, and Barajita, and from Gila Bend, to cultivate the soil.

El Mezquite, Rancheria. In Papago, *Vátjeki* ("Small Waterhole." The hole was made and water gathered by digging with a basket). North of La Nariz, *r.*, Sonora, Mexico, nine miles (three leagues) from the boundary line, in a basin near Mezquite Range. Very old, probably now abandoned.

Fresnal, Rancheria. It consists of three rancherias in the western and middle part of Baboquivari Range.

1. *Kóxikux* (*Kóxi*, mulberry tree; *kux*, where it stands) is the most northern.
2. *Tshtul͠iseik* ("Willow Forest." *Tshtul͠i*, willow; *seik*, forest). One mile south of Kóxikux.

3. *Pitóikam* ("Where there are ash trees." *Pĭtoi*, ash tree). Three miles south-west of *Tshíul̃iseik*. This latter rancheria is the largest of them. Probably there are no less than five hundred souls in the three rancherias. Nos. 1 and 2 are situated one and one-half miles in among the foot-hills, about four thousand two hundred feet above sea level; No. 3 is at the beginning of the llano.

Gĭtikivok, Summer Rancheria. "Where the plough was lying." (*Gĭtik* (also *kĭtik*), plough; *vok*, lying.) South of Indian Oasis.

Horseshoe, Placer gold mine, store, and post-office. In Papago, *Komaktjĭvurt* ("Gray Soil." *Kómak*, gray; *tjĭvurt*, soil. The name alludes to the presence of *caliche*). In the Quijotoa Range. The gold digging itself was formerly alluded to as *ól̃ak*, "Where there is gold" (*oro*). At present only the Indians occasionally dig for gold.

Indian Oasis, store and post-office, seventy miles west south-west of Tucson. (*See Kómoktetuvávosit.*)

James' Ranch, Rancheria. In Papago, *Vavstjûutak* ("Green Rock." *Vav*, rock; *stjûutak*, green). In the Artesa mountains, a couple of miles south of Indian Oasis.

Jiquibo, also called *Pirigua*, Summer Rancheria. "Where there is a rough mountain." (In Papago, *Hĭkibon* or *Hikjovan*. *Hik*, rough, ridged. Hair that has been cut short is also said to be *hik*.) Situated on a llano in a kind of basin, north-east of Ajo copper mine. There are several waterholes or wells here, and the Indians are said to use the water for irrigating purposes.

Kâitjimök, Summer Rancheria. "Burnt Sahuaro Seed." (*Kaitj*, seed of the sahuaro fruit; *mök*, burn.) Another name for Santa Rosa, *s.*

Kakota, Rancheria. "Crooked." It is on the south-west side of the Quijotoa Range, eight miles south of Horseshoe. Indians settled here, falling heir to a well that some Mexicans abandoned when the placer mining of the place gave out.

Kávol̃ik, Summer Rancheria. "Hill." Six or seven miles south of *Kuóitak*.

Kavvâxiak, Rancheria. "Badger's Well." (*Kav*, badger; *vâxia*. *See under* Comobabi.) In the Comobabi mountains, about six miles north-east of Noria, *r.*

Kŏl̄ipatvóoka, Summer Rancheria. "Dead Old Man's Pond." (*Kŏl̄i*, old man; *pat*, dead, something of the past; *vo*, pond.) Fifteen miles north-east of Horseshoe.

Kómal̄ik, Summer Rancheria. "Mountain Crest." Name is derived from a low ridge north of the place. Ten miles south-west of Fresnal, *r*. It has a pond.

Kómoktetuvóvosit, Rancheria. "Where the turtle was caught." (*Kómoktet*, turtle.) It is a mile from Indian Oasis and was established five years ago.

Kukómal̄ik, Rancheria. "Big mountain crest." (*Ku*, large, big; *kómal̄ik*, mountain crest.) Fourteen miles north of *Ânekam*. It is twenty-five to thirty miles west to south of Silver Bell. The village is inhabited all the year on account of a well left by an American. Its fields are insignificant. The inhabitants go to *Ânekam* for religious ceremonies.

Kuóitak, Summer Rancheria. "Large Fields." (*Ku*, large; *óitak*, field, milpa.) Thirteen miles south of the "Pumphouse."

Kutjûupo, Rancheria. "Big waterhole in the rock." (*Ku*, big; *tjûupo*, rocky cavity containing water, natural water tank; Spanish, *tinaja*.) In the western foot-hills of Baboquivari Range, eight to ten miles north of Fresnal, *r*.

Kvítatk, Summer Rancheria. "Mezquite Root." (*Kvi*, mezquite; *tatk*, root.) Thirteen miles north-west of Indian Oasis; one-half mile from the "Pumphouse."

Kvívo, Rancheria. "Below," "Low Down." One and one-half miles north-east of Santa Rosa, *s*.

La Lesna, Rancheria. In Papago, *Shuunâkia* ("Hanging Wolf." *Shûu*, wolf; *nâkia*, hanging). Three miles from the boundary line, eleven miles (four leagues) north-west of Banori, *r*., Sonora, Mexico.

La Moralita, Rancheria. Papago name unknown. It is ten or twelve miles north-east of La Nariz, *r*., in Sonora, Mexico.

La Quituni, Summer Rancheria. In Papago, *Âktjin* ("Arroyo's Mouth." *Ak*, arroyo; *tjin*, mouth). North-west of La Nariz, *r*., Sonora, Mexico, three miles from the boundary line. It used to be visited by Indians from Sonoita, but has been abandoned over ten years.

Los Camotes, Rancheria. In Papago, *Shâatkam* (Name of an edible root). Situated three miles west of the Mezquite Range, near the boundary line, northward of La Nariz, *r.*, Sonora, Mexico. Two families live here, who go to Sonoita when the water gives out.

Makumivóoka, Rancheria. "Caterpillar Pond." (*Mâkum*, a yellow, black-striped caterpillar, boiled and eaten by the Papago. It appears in August. *Vo*, pond.) It is nine miles south-east of *Kvívo*, *r.* (near Santa Rosa, *s.*)

Milpitas, Summer Rancheria. In Papago, *Kókul̅i* ("Corral," "Enclosure"). Twelve miles south-east of Pozos Muchos, *r.* (northern part of the Papagueria).

Nóipokam, Rancheria. The name is of Spanish origin, meaning unknown. It is north-west of Horseshoe, in the Quijotoa Range, two miles from Brownell.

Noria, Rancheria. In Papago, *Nóol̅ik* (Corruption of the Mexican name which means "spring"). It used to be called in Papago, *Vípenak* ("Where *vípenoi*, a small cactus, is growing"). It is a short distance west north-west of Indian Oasis. This is an old village and it has more people now than before.

Notovaxia, Rancheria. "Well where the sacaton grass grows." (*Not*, sacaton grass; *váxia*, well, waterhole, also spring.) In the northern part of the Comobabi mountains.

Óotovaxia, Rancheria. "Sand Well." (*Óot*, sand; *váxia*, well.) In the northern part of the Comobabi mountains.

Pelon or *Rancheria del Pelon*, Rancheria. Also called "Lower Village." In Papago, *Kvívo* ("Below," "Low Down," namely, on the river). It is in Gila Bend Papago Reservation, ten miles from Gila Bend railroad station.

Pirigua, Summer Rancheria. (*See* Jiquibo.)

Pisinemo, Summer Rancheria. In Papago, *Piśinemoi* ("Bear's Head." *Piśin*, brown bear; *mo*, head.) It is fifteen miles north-west of the south end of the Quijotoa Range.

Pozo Blanco, Rancheria. In Papago, *Komváxia* ("Well where the *kom* tree (Spanish, *comaru*) grows"; *váxia*, well, waterhole, also spring). Near the Quijotoa range, eight miles south-west of Brownell; four or five miles west of "Covered Well." It is forty miles from Pozo Redondo, *r.* Four or five families live here.

Pozo Colorado, Rancheria. In Papago, *Vŏkivâxia* ("Red Well." *Vŏk*, red (usually *sövŏk* or *suvâk*); *vâxia*, well, waterhole, also spring). Near Pozos Muchos, *r*. It is a very old rancheria, inhabited by two to four families.

Pozo de Federico, Rancheria. (*See* Wall's Well.)

Pozo Redondo, Rancheria. In Papago, *Sikorttjûupo* ("Round Tank." *Sĭkort* (*sĭkul*), round; *tjûupo*, rocky cavity with water; in Spanish, *tinaja*). It is about twelve miles east of Ajo copper mine, on the east side of the Pozo Redondo Range. These Indians have fields in Cubo, *s*.

Pozo Tapădo, Rancheria. (*See* Covered Well.)

"*Pumphouse*," Rancheria. About twenty years ago a mining company made a deep well and a pump with a large chimney, eight miles south-east of Horseshoe, in the Quijotoa Range. The well was later abandoned. Some Indians established themselves here, and this small rancheria is now usually called *Vâinomkux* ("Iron prominence." *Vâinom*, iron; *kux*, standing, prominent).

Pozos Muchos, Rancheria. In Papago, *Moivâxia* ("Many Wells." *Mŏi*, many; *vâxia*, well, waterhole, also spring). South south-east of Gila Bend, eight miles easterly of Sauceda, *r*. Eight to ten families live here. They have several waterholes or wells and are said to irrigate with this water.

Quitovaquita, Rancheria. In Papago, *Āl̃ivaipia* ("Small Springs." *Āl̃i*, small, child; *vaipia* is plural of *vâxia*, well, waterhole, spring). South of Ajo copper mine, just within United States boundary. This is a locality with many small springs of good water. It is permanently occupied by one or two families. Some agriculture.

Rincon, Rancheria. Two miles north of *Sepânovak*, *r*.

Rincon, Rancheria. In north-eastern part of Baboquivari Range. A large rancheria, belonging to a civilized Papago. According to my interpreter, Pablo, there are no other rancherias on the eastern side of Baboquivari Range.

San Lorenzo, Rancheria. In Papago, *Sil̃inakik* ("Hanging Saddle." *Sĭl̃i*, saddle, a corruption of the Spanish *silla*). Twelve miles east south-east of *Makumivŏoka*.

San Miguel, Summer Rancheria. Five miles south from *Tjûul̃ik*, *s*.; ten miles north of Monument 143 on the boundary line. Of recent date.

San Pedro, Rancheria. In Papago, *Vtopol̄i* (a kind of tobacco). This is a new rancheria in the Roskruge Range, seventeen miles' distance north from Hayes's Well, thirty-six miles from *Makumivóoka, r.*

Santa Rosa, Summer Rancheria. In Papago, *Kuŭtshi* ("Big Peak." *Ku*, large; *ŭtshi*, narrow mountain). The name is derived from a mountain near by, to the west. In Santa Rosa Valley. This is the largest summer rancheria, and is probably also to a certain extent inhabited in the winter. The fields extend nearly two miles in either direction.

San Xavier del Bac. In Papago, *Văk*, which means "where the river reappears in the sand," a "sink" of the river.

Sauceda, Rancheria. In Papago, according to information from Mr. F. Wall, called *Tshiul̄ikami* ("Where willow grows." *Tshĭul̄i*, willow). South of Gila Bend railroad station and seventeen miles east north-east of Batamote ranch. This is the main rancheria of the north-western part of the Papagueria. I am informed by reliable authority that there are fifty to seventy houses here. In 1910, on account of want of water for the cattle, only thirty to forty individuals lived here.

Sepănovak, Rancheria. "The smell of the coyote." (*Pan*, coyote.) Small rancheria in a narrow valley in the middle part of the Baboquivari Range.

Stĭl̄imŏk, also called "Upper Village," Rancheria. "Burnt Saddle" (*Stĭl̄i* (Spanish, *silla*), saddle; *mŏk*, burn). In Gila Bend Papago Reservation, about eighteen miles north of Gila Bend. In 1910 it had fourteen families, immigrated less than twenty years ago, from Sauceda, *r.*

Sikulhĭmatk, Summer Rancheria. "Water going around." (*Sĭkul*, round.) Five miles north of the "Pumphouse," east of Horseshoe. The water-shed is here, between water flowing into the Gila River and to the Altar River.

Sŭsuta, Rancheria. In Papago, *Shŏsetak* ("Where water gathers"; *shŏtak*, water.) Three leagues north-east of La Nariz, *r.*, Sonora, Mexico. In the winter five or six families live here. The water lasts sometimes for a year.

Tecolote, Summer Rancheria. In Papago, *Tjŭkutko* ("Owl's Cry." *Tjŭkut*, owl; *ko*, cry). An old rancheria fifteen miles west south-west of Indian Oasis.

Temporales, without name yet. Nineteen miles east of *Makumivŏoka*, *r.*

Tesota, also called "Second Village," Rancheria. In Papago, *Úupatoitak* ("Cat-claw Field." *Úupat*, the tree called cat-claw, in Spanish, *tesota; ŏitak*, field for planting, *milpa*). In the Gila Bend Papago Reservation, five and a half miles east of Pelon, *r.* It consisted in 1910 of eight families, immigrated from Pozos Muchos, *r.*

Tjeavol̄itak, Summer Rancheria. "Where the barrel cactus is." (*Tjeăvol̄i*, barrel cactus; in Spanish, *bisnaga.*) Two miles from an abandoned ranch called Fresnal, between Maishe's Well and Indian Oasis.

Tjĭuvak, Rancheria. "Where something rotted." Five miles north of Horseshoe.

Tjotomvaxiaka, Rancheria. "Bear's Well." (*Tjŏtom*, bear; *văxia*, well, waterhole, also spring.) In the Baboquivari Range, about eight miles south of Fresnal, *r.*

Tjŭul̄ik, Summer Rancheria. "Corner." On the plains, south south-west of Fresnal, *r.*, six miles south of *Kŏmal̄ik*, *s.*

Tjŭupo, Rancheria. "Rock cavity with water." Name alludes to some cavity in the rock containing water, a natural tank; Spanish, *tinaja.* In the Quijotoa Range, perhaps ten miles north of Brownell.

Tŏapit or *•Tŏapit*, Summer Rancheria. "White Clay." (*Tŏa* or *•Tŏa*, white; *pit*, clay.) Twelve miles north of Jiquibo, *s.* Seven or eight families come here.

Topahua, Summer Rancheria. In Papago, *Kŏksumök* ("Burnt Dog." *Koks*, dog; *mök*, burn). Seven miles south of Indian Oasis.

Tŏtobitk, Summer Rancheria. "Crooked." Ten miles from Cacate, *s.*

Tshĭovo, Summer Rancheria. "Long Pond." (*Tshi*, long; *vo*, pond.) Eight miles south-west of the south end of Quijotoa Range.

Tucson City. Originally a rancheria. In Papago, *•Tjukson* ("At the foot of the black hill." *•Tjuk*, black; *son* or *shon*, at the foot of). The name alludes to the hill nearest to the Santa Cruz River, and near that on which the Desert Botanical Laboratory is.

Vámul̄i, Summer Rancheria. "Basin" (low place where water gathers). It is near *Gitkivok, r.*

Vávemo, Rancheria. In Papago, "Mountain with Head." (*Vav*, mountain; *mo*, head.) The name alludes to a low ridge on top of which is a rock. Ten or twelve miles (four leagues) south of Indian Oasis. Many Indians here.

Vávkux, Rancheria. "Projecting Rock." (*Vav*, mountain, rock; *kux*, standing, prominent.) In the northern part of the Baboquivari range; three miles from Hayes's Well.

Vopel̄ohavóoka, Summer Rancheria. "Burro Pond." (*Vópel̄o*, burro, donkey; *vo*, pond.) *Ha* has no special meaning; usually it means "there" or "what." Eight or nine miles south-west of Topahua, *s.*

Wall's Well or *Pozo de Federico*, Rancheria. In Papago, *Kóokatsh* ("mountain crest"). Sixteen miles east of Bates's Well, right at the northern point of Sierra del Ajo. There used to be some mining done here, which has been abandoned, a few Indians from Barajita afterward settling there and taking possession of the wells. Information from Mr. Frederick Wall, who discovered and named the Growler mine.

PIMA RANCHERIAS

South of Casa Grande railroad station, on the Southern Pacific, are found the following four Pima Rancherias, inhabited by the so-called Kohátk people.

Kohátk, Pima Rancheria. "Depression." (Literally: "Where a hollow has been made" through water or other agency.) It is situated due east of the Vekol mine, and nine miles north-west of *Kukómalik*, a Papago rancheria. Elevation, 2,500 feet.

Tatamúmerikut, Pima Rancheria. "Where the foot had run." (*Tat*, foot; *múmeri*, run; *kut*, where.) It is four miles north of the Jack Rabbit mine, is very old, and foot-racing is said to have started here. Foot-races, accompanied by betting, are still practised, two or four men running together at one time. They have also races called *wítshuta*, where a ball is tossed along, similar to those in use among the Tarahumares of Chihuahua, Mexico.

Tshûhutsho or *Tjûitjo*, Pima Rancheria. "Caves." Name alludes to some natural cavities in the ground (*tshûhu*, cave) nine miles from Casa Grande railroad station and from *Vaivavo*, *r*.

Vaivavo, Pima Rancheria. "Cocklebur Pond." (*Vâiva*, cocklebur; *vo*, pond.) Twelve miles north of *Kohâtk*, *r*.

II.—SONORA, MEXICO

DISTRICT OF ALTAR

Agua Prieta, Rancheria. (*See* Pozo Prieto.)

Akimuri, Rancheria. "The River." The present site of the Indian settlement of Sonoita, the Mexicans having occupied the lands where the Indians originally lived, and where the small Sonoita River sallies forth. It is about one mile down the river from the Mexican settlement and goes under the name of *El Pueblo*. Considerable wheat is cultivated by irrigating with water from the river, and the Indians, the number of whom varies according to season but generally may be seventy to eighty or more, are well-to-do. *See* Sonoita.

Akitaivuni, Summer Rancheria. "Where the river begins." (*Akⁱ*, river, arroyo; *vun*, begin.) Situated six miles east of Sonoita, where there were several swamps before the river, some years ago, broke through the gravelly accumulations. Abandoned.

Alamito, Mexican ranch, formerly Papago rancheria. In Papago, *Vâipia* ("Waterholes," "Springs"). Two miles north of the town of Trincheras. There is an old church here. Miguel, an old Indian of Quitovac, saw Indians living here seventy years ago.

Alamo Muerto, Mexican ranches, formerly Papago rancheria. In Papago, *Âupa* ("Cottonwood Tree." Plural is *aûpa*). Eight leagues west of Caborca and four leagues north-east of Pozo Moreneño, it is situated on the Altar River, on the llano; the ranches are about north of the Sierra del Alamo, which is near by, and three leagues west of Bisani.

Altar. Town on the Altar River, formerly rancheria. In Papago, *Vâvuk* ("Where there is a mountain." *Vav*, mountain, or rocky place). Three families live in the outskirts, making a living by working for Mexicans.

Arivaipa, Mexican ranch, formerly Papago rancheria. In Papago, *Ālivaipia* ("Small Springs" or "Small Waterholes." *Āl̄i*, small, child; *vâipia* is plural of *vâxia*, well, waterhole, spring). Eight miles south-east of Garambullo ranch. The Papagoes used to have fields here. The old men died and the young men went to Arizona.

Arivaipa. Papago camp, abandoned; formerly of importance. It is about thirty-five miles east of Puerto de Libertad, fifteen miles from the coast. This marks the southern limit of the Papago tribes' extension. A reliable old Indian, Miguel of Quitovac, knows this place, of which Mr. M. Taylor, formerly superintendent of the Yaqui mine, gave me the following description: "A large mezquite tree is growing on the south side of the arroyo. Here the Papagoes from Pozos de San Ignacio used to camp before being dispossessed by the *rurales*. East of this tree, on the bank of the arroyo, is another mezquite overhanging the arroyo; one of the limbs has been cut off. Directly under that cut one should dig for water which will be found eight to ten feet deep in the sand; it stands in caliche, into which a two-foot deep hole has been made." According to the same informant, there is a Seri well, "Coyote," on the same arroyo, six miles from the coast. The main camp of the Seri Indians, perhaps now numbering two hundred in all, is said to be at no great distance from there.

Arivaipa. This name also appears on the upper Gila River, near the San Carlos Reservation. Formerly the Apaches used to be there.

Atil, Mexican Pueblo, formerly rancheria. In Papago, *Átshi* ("Narrow Mountain"). Six leagues from pueblo Oquitoa on the Altar River.

Bajio de Evaristo, Summer Rancheria. In Papago, *Htashpik* ("Buried"). According to tradition, a beautiful Papago woman was buried here. It is situated in the fertile, long, broad valley leading west to Sonoita. About fifteen families live here.

Banori, Rancheria. In Papago, *Vânol̄ik* ("Curve"). Seven miles east of Mexican rancheria Bajio del Alcalde, which hauls water from there. It is not far from the other Banori, both of them located near the boundary.

Banori, Mexican ranch, formerly Papago rancheria. Two miles west of Cobota. It is probably the ranch which formerly was called Pozo de Luis. Two Papago families keep animals there by permission of the Mexican owner, J. Celaya.

Bisani, Hacienda. Formerly rancheria. In Papago, *Vtisin* ("Small, deep arroyo"). Sixteen miles west south-west of Caborca. The extensive and fertile lands have been made into a Mexican hacienda for wheat raising. Fourteen or fifteen families live here who are dependent on the hacienda for work. Ruins of an old Jesuit church are existent.

Caborca. Town on the Altar River, formerly rancheria. In Papago, *Kávortk* ("Rounded Hill"). Seven families live in the outskirts, two of them possessing and cultivating *milpas* (garden fields), the rest being laborers for Mexicans.

Cacate, Rancheria. In Papago, *Kâka* ("Clearing"). On the south-western side of Sierra de Santa Rosa (east of Sonoita). Abandoned fifteen years ago.

Carricito, Rancheria. In Papago, *Vapktjuutshk* ("Where the reeds stand." *Vapk*, reed; *tjûutshk*, upright, standing). Near Rancho de Macias, toward the boundary line. Nine families; the men seek work in the Campana gold mine.

Charco de Chavarria, Summer Rancheria. In Papago, *Kávoit* ("Badger's Field." *Kav*, badger; *óitak*, field, milpa). Four leagues east of Sonoita. Papagoes used to live here formerly, and in the last four years a couple of families are again occupying the country.

Charco de la Mujer, Rancheria. In Papago, *Ófviavóoka* ("Woman's Pond." *Ófvi*, woman; *vo*, pond). Two leagues north north-east of La Nariz, *r*. People from La Nariz visit it for the sake of obtaining water for the cattle. Otherwise it appears abandoned.

Chujubabi, Rancheria. In Papago, *Tshuhuvaxia* ("Cave Well." *Tshûhu*, cave; *váxia*, well, waterhole, also spring). Four leagues south-east of Quitovac. It is inhabited by three or four families.

Cóbota, Rancheria. In Papago, *Kóvortk* ("Hollow in the ground"). It is on the west side of the peak of Cóbota, about eight miles south-east of Cerro de la Lesna, and four miles south of the boundary. Ten families live here. When the water is consumed they go to Tecolote, *s.*, Arizona, where they have fields.

Comobabi, Rancheria. For interpretation *see* Comobabi, Arizona. It is six leagues east south-east of Cobota. More than ten families live here.

Coyote, Summer Rancheria. In Papago, *Panvaxia* ("Coyote Well." *Pan*, coyote; *váxia*, well, waterhole, also spring). A small rancheria, north of Tajitos mine (about twenty-five miles north of Caborca). Water is procured by digging holes in the river bed.

Cubabi, Rancheria. In Papago, *Kovaxia* ("Hidden Well." *Ko*, cover; *váxia*, well, waterhole, also spring). Near the Sierra de Cobota, four leagues north of Plomo, mining town. Eight to ten families.

Cubo, Mexican ranches, formerly Papago rancheria. In Papago, *Kuvo* ("Big Pond." *Ku*, big; *vo*, pond). Thirty miles north of Caborca.

Cûmaro, Rancheria. In Papago, probably, *Komvaxia* (*Kom*, tree with red berries, called by the Mexicans *cumaro*; *váxia*, well, waterhole, also spring). About eight leagues west of Sasabe custom-house and two leagues from the boundary. Four or five families live here.

El Durasno, Rancheria, abandoned some time ago. Situated north of the mountain of the same name (north of Carricito, *r.*), at the foot of it. Water was brought from some pools in the mountain. Sons of those who lived there are still alive.

El Picu, Rancheria. In Papago, *Óokobonjik*^{i} ("Tears." *Óok*, tears; *bŏnjik*^{i} is euphonistic, and does not mean anything by itself). Water comes up very sparingly, hence the name. It is about forty-five miles south south-west of Caborca and eight leagues west of Pozos de San Ignacio. Has been uninhabited for more than thirty years, though some Indians from Pozos de San Ignacio had a ranch here.

El Tren. Abandoned mining village, formerly Papago rancheria, called, in Papago, *L̄tima* ("Whetting Stone." In another version the name *Lin* is a corruption of Trinidad and means nothing). Near Zoñi. Placer mines were formerly worked here.

Kĭkimikux, Summer Rancheria. "House Standing." (*Ki*, house; *kux*, standing, prominent.) It is less than one league east of Cúmaro, *r.*, There are ten families living here.

La Espuma, Rancheria. In Papago, *Tŏtshaki* ("Foam." Water makes foam in the hole when being excavated in the sand. Good water to drink). In the Sierra de la Espuma, south of La Nariz. It is inhabited only in the winter.

La Nariz, Rancheria. In Papago, *Táak* ("Nose"). It is situated at the foot of the south-eastern promontory of the Sierra de la Nariz. Its profile resembles a nose, hence its name. In the winter usually fifteen families live here. At the time of my visit in November there were five families; some were absent in Represa de Enrique, others were working for the Americans (agriculture) in Arizona. There is a dam here made by Mexicans, American citizens, who are trying to drive the Indians away.

Lesna Vieja, Rancheria. In Papago, *Kuktjuitakkux* ("Palo Verde Standing." *Kuktjûitak*, palo verde; *kux*, standing, prominent). It is about three leagues north-east of Bajio de Evaristo, in the north-western part of the District of Altar, at the edge of the basin. Abandoned about twelve years ago. Ruins of huts and a broken dam can still be seen.

Llano de Juan Ramon, Summer Rancheria. In Papago, *Kókaul̃ivo* (*Kókaul̃i*, a bush called in Spanish *garambullo; vo*, pond. "Pond among garambullo Bushes"). It is one league south-east of Garambullo ranch. Has been abandoned probably fifty years.

Ónak, Rancheria. Pronounced *Sónak* in Bisani ("Where there is salt." *On*, salt). Twelve leagues south-west of Caborca; three leagues west of Pozo Prieto (abandoned *r.*). Abandoned in the present generation. Mexicans had here formerly gold and silver mining by *arrastras*.

Oquitoa, Mexican Pueblo, formerly rancheria. In Papago, *Hókito* ("Boundary Limit"). Two leagues north-east of Altar, on the Altar River.

Pitiquito, Town on the Altar River, formerly a rancheria. In Papago, *Ptitskin*, "Gone to Nothing." The name alludes to the annihilation of both parties to a combat which is said to have taken place on a mountain near the present town. On account of the permanency of water in this part of the river and the fertility of the plain, this locality is to-day of agricultural importance. There are four Papago families here, who work for the Mexicans.

Pozo Grande, Rancheria. In Papago, *Kuvaxia* ("Big Well." *Ku*, big, large; *váxia*, well, waterhole, spring). It is near the south-western point of Cerro del Viejo, ten leagues south of Caborca. Has been uninhabited for fifty to sixty years.

Pozo Moreneño, Rancheria, abandoned. Near the southern part of Sierra del Alamo. Twelve leagues south-west of Caborca, three leagues from Pozo Prieto (abandoned *r*.).

Pozo Prieto or *Agua Prieta*, Rancheria. In Papago, *ˢTjukshootak* ("Black Water." *ˢTjuk*, black; *shóotak*, water). Near the foot-hills of Sierra del Viejo, two leagues from Pozo Grande. Papagoes from Bisani visit it every year, but it is more or less abandoned.

Pozo Verde, Rancheria. In Papago, *Tjuitakvaxia* ("Green Well." *Tjúitak*, green (also *stjúitak*); *váxia*, well, waterhole, spring). The name is derived from a fine spring at the foot of the Baboquivari Range, about a mile south of the boundary line, and a few miles west of Sasabe custom-house. The largest rancheria in Sonora. Twenty-five to thirty families are said to live here. There is a general here in charge of all the Papagoes of Sonora. The place is of importance in the mythology of the tribe.

Pozos de San Ignacio, Rancheria. In Papago, *Tootavaipia* ("White Waterholes." *Tóa* or *ˢTóa*, white; *váipia*, plural of *váxia*, waterhole, spring). The earth is white here, probably on account of the presence of caliche. It is about twenty leagues south of Caborca. This rancheria was given up in 1907 after a brave fight with the *rurales* (Mexican police), of whom eighteen were killed, nearly all the Indians escaping with their belongings into Arizona. Many families were living here, sixteen persons being full-grown men.

Quelḗle Quemado, Rancheria. In Papago, *Kúsitmohitatsh* ("Burnt Carrion Hawk." *Kúsit*, carrion hawk, with a yellowish throat). One to two leagues north of Lesna Vieja, *r*. Abandoned long ago.

Quitovac, Rancheria. In Papago, *Vapk* or *Vâketa*, "Reeds" (*Vapk* is the name for reeds; they here grow in a swamp, produced by flow from the springs). An important place in the life of the tribe. Several fine springs at one locality furnish abundant water. There was once mining activity here. At present only the Indians occasionally "dry wash" the placer mines. Two or three Mexican families live here and there is a store. The Indians are fairly well-to-do, and in the winter as many as fifteen families may be found at Quitovac.

Represa de Enrique, Summer Rancheria. In Papago, *Njûoport* ("Nighthawk"). It is situated in the fertile, long, broad valley leading west to Sonoita. Seven families have cattle here and own a large pond. They come from La Espuma, *r*.

San Pedro, Rancheria. In Papago, *Somûok* ("Peak"). One league south-west of Coyote, *r*. Four families live here.

Santo Domingo, Hacienda, formerly Papago rancheria. In Papago, *Tjûtshpa*, "Pounding Stone." (*Tjûtshpa*, a rude stone vessel in which mezquite beans, mescal, etc., are pounded with a stone pestle; sometimes a hollow is made in the rock for the same purpose.) Seven miles west of Sonoita on the Sonoita River. A large tract of land was cultivated here by Mexicans, through irrigation from Sonoita River, but it has been abandoned for several years. No Indians live here any more.

Saric, Mexican Pueblo, formerly rancheria. In Papago, *Shâarik* ("Pass." Spanish, *puerta*). Five leagues from Pueblo Tubutama on the Altar River, near the boundary of the District of Magdalena. Some Papagoes live here.

Sasabe, Mexican custom-house, formerly a rancheria. In Papago, *Shâshovuk* ("Echo").

Sonoita, Rancheria. In Papago, *Kavortkson* ("At the foot of the rounded hill." *Kâvortk*, rounded hill; *son*, in Sonoita pronounced *shon*, at the foot of, base). Sometimes the place is designated in an abbreviated manner as *shon* only, from which possibly the Spanish name Sonoita is derived. The oasis was originally called Sonoitag or Sonoidac. In the reprint of Ortega's "Apostolicas Afanes," Mexico, 1887, the name Sonoidag is attributed to the Indians. Speaking of Father Kino's journey in 1699, the narrator says: "They gave the name San Marcelo to a place which the natives call Sonoidag, a very favorable locality on account of its lands, pasture, and abundant water" (libro 2, cap. 7, p. 340). The rancheria used to be near the beginning of the river, but the Indians have gradually been driven by the Mexicans lower down, occupying now a site one mile from the Mexican village of Sonoita. (*See* Akimuri.)

Suvûk, Summer Rancheria. "Red." (*See under* "Camps of the Sand Papagoes or Areneños.")

Tubutama, Mexican Pueblo, formerly rancheria. In Papago, *Tjúvutam* ("High Up"). Three leagues from Mexican pueblo Atil on the Altar River.

Zoñi, Mexican ranch, formerly Papago rancheria. In Papago, *Shónekam* ("Spring that never dries up"). Six miles from Rancho de Macias in north-western part of the District of Altar. The Campana mine pumps water from here. Formerly there was placer mining here.

CAMPS OF THE SAND PAPAGOES OR ARENEÑOS

These Papagoes formerly occupied the sandy country along the upper part of the Gulf of California, reaching from the lower Colorado River eastward as far as Santo Domingo, near Sonoita, and northward to Gila Range and Cabeza Prieta Range. Their head-quarters was the Pinacate region.

Agua Dulce, Camp. In Papago, *Ikuskaatsh* (*Íkus*, piece of clothing; Spanish, *trapo*). West south-west of Quitovaquita, at a place where the river water appears again. A ranch was established here by a Mexican, but was later abandoned. Both here and at Agua Salada, three miles lower down, the Papagoes used to come in great numbers to hunt or to gather sahuaro, but no agriculture was ever undertaken.

Agua Salada or *La Salada*, Camp. In Papago, *Onokshóotak* ("Salt Water." *Óno*, salt; *shóotak*, water). Name of a certain part of the Sonoita River bed, south south-west of Quitovaquita. One and one-half miles further down is Los Pozitos, the name being derived from small wells that travellers make in the sand of the river-bed, to get water. Drinkable water may be procured in the same way at Agua Salada.

Hótunikat, Camp. "Sunset," "West." South of Pinacate, four miles west of Tinaja de los Chivos. This was the head-quarters of the sand people and, to employ a Mexican usage, may be termed a rancheria. Drinking water was brought from Los Chivos. An annual festival—dancing and singing—was given to procure rain and "make the grass grow." *See page* 228.

La Choya, Camp. In Papago, *Hanammêtjurtivaxia* (*Hânam*, choya, a very spiny cactus of the *opuntia* genus which grows in abundance here; *mêtjurti* was interpreted to me as indicating "in," "near"; *vâxia*, well, waterhole, spring). South of Pinacate. This camp is a few yards from the beach, and fresh water is found in a hole that has been dug ten feet deep.

Laguna Prieta, Camp. In Papago, *Vapk* ("Reeds"). A salt lagoon west of Gila Range (Sierra de las Tinajas Altas). Abundance of fresh water found among the bulrushes on the marshy shore.

La Soda, Camp. In Papago, *Tjûtjaka*. South of Pinacate. This is a deposit of soda, ten miles east of Salina del Pinacate, and three miles from the sea. Fresh water is found by digging on the shore, as well as three miles west at a locality called Tule.

Pozo del Caballo, Camp. In Papago, *Hiatitvâxia* ("Well of the Sand Dunes." *Hía*, *Híati*, or *Híatit*, sand dunes, sand; *vâxia*, well, a hole dug to reach water, also spring). This locality is about halfway between Salina del Pinacate and Salina Grande. It is a difficult place to find, near some high sand dunes west of Estero del Tule.

Salina del Pinacate, Camp. In Papago, *Óno* or *On* ("Salt"). Also called *Kavonoka* ("Badger's Salt." *Kav*, badger). A small deposit of salt in a slough three miles from the coast, south-west of the Pinacate region. This is the principal place from which the Papagoes gather salt. Fresh water is found by digging on the shore.

Salina Grande, Camp. In Papago, *Murtegshôotak* ("Running Water." *Mûrteg*, running; *shôotak*, water). A large salt deposit forty miles east of the mouth of Colorado River, three miles from the coast. On the flat, north-western shore are sixteen fresh-water springs.

Sierra Blanca, Camps. In Papago, *Tôakomal̄ik* ("White Mountain." *Tôa* or *ˢTôa*, white; *kômal̄ik*, mountain crest). A sierra south of Pinacate. A small water tank lasting three months is found near the north-east point on the east side, but the Indians had several camps, especially on the south side of the range.

Sierra del Rosario, Camps. In Papago, *Hiatikomal̄ik* ("Mountain Crest in the Sand." *Híati* (also *Hía* or *Híatit*), sand; *kômal̄ik*, mountain crest). A mountain range among the sand dunes south of Gila Range (Sierra de las Tinajas Altas). Though far from water, there are many evidences of camping places here.

Suvûk, Summer Rancheria. "Red." A hill near by has the same name. In the Pinacate region, five miles south-east of Tinajas de Emilia. There was some agriculture here, among the lava ridges. People came from Batamote to cultivate brown beans, white beans (*têpari*), maize, and squashes on a small scale. It is doubtful whether these can be considered sand people, probably not. Nearer the coast no attempt at agriculture was ever made. There is a tinaja near by called *tjûumikux* ("Where the pitahaya stands." *Tjûmi*, a kind of pitahaya cactus; *kux*, standing, prominent).

Tinajas Altas, Camp. In Papago, *Óovak* ("Where arrows were shot." *Óo*, arrow). The name originates from a legend about two Indians who shot arrows from either side of the ridge. One did shoot across. Where the arrows of the other fell short the pools appeared. These well-known tinajas, eight in number, are in the southern part of the Gila Range (Sierra de las Tinajas Altas) that stretches from the neighborhood of Yuma south-east. It is on the old track from Caborca, over Sonoita, to Yuma.

Tinaja de los Chivos, Camp. In Papago, *Hôtunikat* ("Sunset," "West"). The Spanish name is the vulgar expression *chivos* (goats) for mountain-sheep. In the south-western part of Pinacate. An important camp. There is a track leading from here to the former main camp of the sand people, called by the same name, *Hôtunikat*. Another track leads over the mountains to Tinajas de Emilia.

Tinaja de los Papagos, Camp. In Papago, *Hitjuupo* ("Urine Pool." *Hi*, urine; *tjûupo*, natural tank, water in rock cavity; Spanish, *tinaja*). The name alludes to imaginary spoliation by the departed. In the north-western part of Pinacate. In years of ordinary rainfall the three tinajas here furnish water all the year round. An important camp.

Tinaja del Cuervo, Camp. In Papago, *Havanikosh* ("Raven's Nest." *Hövani*, Raven (*corvus cryptoleucus*); *kosh*, nest). In the south-western part of Pinacate. This is a regular camp of the salt expeditions. Water can nearly always be depended upon here.

Tinajas de Emilia. In Papago, *Moitjûtjupo* ("Many Pools." *Moi*, many; *tjûupo*, water in natural cavity of the rock, natural tank; in Spanish, *tinaja*). An important camp on the slope of Pinacate, south-east of Los Picos del Pinacate, in a straight line hardly two miles from the top. There are four large, natural tanks here, one of them fairly easy of access. In years of ordinary rainfall the water lasts here all the year round.

Tinajas de la Cabeza Prieta, Camp. In Papago, *ˢTjukomókamtjûupo* ("Black Head Pools." *ˢTjuk*, black; *mo*, head; *tjûupo*, water in natural cavity of the rock, natural tank; in Spanish, *tinaja*). The Cabeza Prieta Range is east of Gila Range (Sierra de las Tinajas Altas). In the middle part, on the east side, is found a number of *tinajas*, one above the other, in a narrow gorge at the foot of the tallest top, from which the range derives its name. This must have been an important camp of the sand people, and certain old, crude stone heaps are found at the entrance to the gorge. (*See page* 324.)

Tinaja del Tule, Camp. In Papago, *Otoxakam* ("Where there is Bulrush." *Ótoxak*, bulrush (*typha latifolia*); in Spanish, *tule*). A well-known pool on the old trail from Caborca, over Sonoita, to Yuma, one day's journey east of Tinajas Altas.

Tornillal, Camp. The name in Papago is slightly doubtful, but is probably *Totshakshóotaki* ("Foam on the Water." *Tótshak*, foam; *shóotak*, water). Twenty-five miles from the mouth of Colorado River, fourteen miles west of Salina Grande, on the coast, one-quarter of a mile from the beach. Screwbean trees (in Spanish, *tornillo*) grow here, hence the name given to the locality by my guide. Water has to be dug for, and is brackish and bitter.

APPENDIX III

GEOLOGICAL SKETCH OF THE PAPAGUERIA

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THE two groups of formations most extensively developed in the Papagueria belong respectively to the most ancient of rocks and to those formed during geologically recent times—to the pre-Cambrian complex on the one hand and to the Tertiary-Quaternary group on the other. This great area has been studied only in spots by geologists, and therefore detailed knowledge of the formations is lacking, and they have not been matched up with those of other and better known portions of the country. As far as present knowledge goes, the older group consists of gneisses, schists, slates, crystalline limestones, and coarse grained granites—the granites and granite-gneisses being most abundantly developed in the south-western portion. The group of younger rocks is made up chiefly of extrusives; volcanics represented by andesites, rhyolites, rhyolite-tuffs, and basalts. These are mentioned in the order of eruption as shown in the majority of localities. The most recent of the basalts, the extrusion of some of which may have continued into historic times, form in cases perfect volcanic cones, but the older lavas and most of the basalts appear as remnants of flows in fault blocks, or better as fault strips, these upturned blocks and strips forming many of the volcanic ranges.

Less widely distributed than the two groups mentioned above, but important throughout the Arizona Copper Fields as ore carriers, are the Paleozoic Series of limestones and quartzites. These are found in the Papagueria in the eastern and southern ranges; for instance, in the Tucson Mountains, the Silverbell Mountains, the Sierrita Mountains, in the Vekol Mountains, in the Caborca Mountains, etc. In the southern Papagueria (Altar District) a Mesozoic age is suspected for the thin bedded limestones abundant in this area, but as far as known to the author the fossil collections necessary to determine this definitely have not as yet been made. Intrusive granites and porphyries, in general somewhat earlier than the flows, intrude all the earlier formations, and are responsible for most of the ore deposits of the region.

Of the many interesting physiographic features of this area, the most striking is the commonly developed knife edge form of the mountains which protrude above, and are partly buried by, the detritus of the valleys. These mountain stumps are always chiselled into precipitous slopes by wind and torrential action. The valley fill is largely subaërial, deposited by the withering torrents from the mountains, which rarely if ever reach the gulf, or brought up by the wind from the present and ancient strands of the gulf, and built into the extensive "médanos" described by Mr. Lumholtz. Only temporary incursions of the gulf up the valleys, in Miocene and later times, are suggested by the fossils collected by Mr. Lumholtz and others, and by the numerous abandoned shore lines of the Salton Sea to the west.

The climate of this region has undoubtedly been dominantly arid during recent geological times (late Tertiary, Quaternary, and Recent Periods), as shown by the physiography of the country, the make-up of the desert fill, etc. Brief respites, however, due to increasing humidity, are suggested by numerous "dry lakes," at times filled with water, and more recent changes by the deserted Indian villages, far from any known surface water supply.

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